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'A very good field in which to operate': patent literature and the post-war information industry

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ABSTRACT
Patent systems rely on information infrastructures that enable searchers, examiners, and other specialists not only to consider legal requirements but also to gather market intelligence, competitor analysis, and other strategic business information. These resources are today considered fundamental to the assessment of a patent system's performance in terms of its reliability and legitimacy. However, this potential was constrained historically by the multiplicity of formats, languages, and time frames in which patents in different jurisdictions were published and issued. This essay traces how a secondary market for patent information materialised from a distinct commercial engagement with these peculiarities of patents as documents. In doing so, the essay explores how patent literature was abstracted, centralised, and filtered through private information providers such as Derwent Publications Ltd that began offering customised patent information products and services in the post-war decades.

KEYWORDS
patents; abstracts; information science; profit; Derwent; index; databases; access

Introduction

The *British Chemical Patents Report*, a manually produced weekly bulletin, began to circulate in Britain and beyond in the late 1940s. This small publication was produced by Montagu Hyams, an employee of a fire extinguisher company based in Brentford, the Pyrene Company Limited. As the company name indicates, Pyrene was involved in both chemical and mechanical research to develop products that could extinguish fires. Hence it was interested in securing patents or licensing arrangements and occasionally engaged in patent litigation, and so had a small department to gather information about patent filings.[1] Among the regular activities of the department was sending young employees such as Hyams to the British Patent Office in London to perform patent searches, reading titles and abstracting applications of potential relevance to the company.[2] This was not unusual, and many firms did the same, particularly following the growth of in-house patent departments in the first half of the twentieth century. However, the most interesting aspect of this initiative was that it gradually shifted from being an in-house to an independent service, after Hyams left Pyrene. This venture grew as it began issuing a multiplicity of patent reports, not only reporting British chemical patents but expanding its purview to cover other countries and types of patents.

The initial success of this commercial endeavour triggered the incorporation of a company, Derwent Publications Ltd, exemplifying the emergence of an information industry

specialising in patents.[3] This industry republished and merchandised patent data highlighting its informational dimensions. In doing so, it forged an intermediary service that shaped patent matters in multiple ways, providing different products, such as abstracts, bulletins, indexes, and databases, to private firms and patent offices. One of the consequences of this development was that it fostered a kind of immediacy between patent offices and commercial firms, offering new ways of reading patents and knowing about their existence. Nowhere is the impact of these services seen more clearly than in the photocopying statistics from companies like Imperial Chemical Industries and Philips Electronics in the late 1970s and early 1980s.[4] Among the most important resource routinely used (photocopied, read, and shared) between patent departments, research laboratories, and factories was Derwent literature, which had already become an integral part of patent work.[5] Even more, patent offices themselves began subscribing to these private abstracting services for the performance of their statutory functions and duties to serve the public and recommended them to companies wishing to strengthen and streamline their patent operations, as early as 1963.[6]

But how did this secondary patent literature become a primary source in less than two decades? What led to that shift that made them essential for patent departments and offices? What problems and controversies did it elicit? This essay explores those questions by tracing the multiple connections and interests that made information services like Derwent essential for patent routines. In so doing, it investigates the profile of a patent information provider: a for-profit private company that exploited public information, that is, an enterprise situated between the public and the private realms of intellectual property. Furthermore, it explores the exchanges of these providers with intellectual property organisations, commercial firms, and patent offices to consider how these contacts served to forge their position as an indispensable resource for handling patents. The purpose behind our enquiry is to reflect on how such mediation – mainly the searching for and signalling of the existence of patents – offered specific opportunities for the business of patent management in the post-war years, while also contributing more broadly to the building of patent information systems in the second half of the twentieth century.

Chemistry as a catalyst

The first reports issued by Derwent focused on chemical patents. The *British Chemical Patents Report* identified interesting extracts in chemical patents and was then converted into weekly bulletins which later came to be known as the *British Patents Report* and the *Commonwealth Pharmaceutical Report*.[7] These reports consisted of patent abstracts included in weekly sets that helped to shift the focus of attention in patents from the legal to the technical or informational perspective. Patents were valued, identified, and read more easily because of the accessibility afforded by these aids. No other body, private or public, had achieved the aim of producing patent abstracts with such coverage by the early 1960s.[8] For instance, the latter reports were unique at the time because they included jurisdictions such as South Africa and because these were not printed and distributed until then.[9]

It is no exaggeration to say that these abstracts enabled information users to gain rapid access to, and make maximum use of, the wealth of patent literature around the world.[10] However, the obvious question remains: why did chemical patents serve as the springboard of such initiatives? One is tempted to say that the historical struggle to define the patentable subject matter made chemical patents the favourite candidates for abstract purposes at such

scale. It was no coincidence that chemical patents as a group were to have a particularly prominent role, first among documentalists and later among information scientists. Chemists had a long tradition of working in classification and knowledge organisation, and the systems already developed in chemistry for indexing compounds were seen as exemplary for other fields of research. Indeed, it was argued that chemists had an advantage in attempting to classify knowledge, as they already had an 'understanding of molecular structure notation systems', which was seen by many as advantageous compared with 'outdated alphabetical indexing systems'.[11] While it is often suggested that law shapes science, here chemistry helped to shape the ways in which legal materials were going to be disseminated. The influence of chemistry had already been visible in relation to both patents and scientific literature.[12] For example, Claus Suhr, when looking back on the development of patent indexing, observed that 'chemical information management has traditionally been, by virtue of its peculiar language, the structural formula, the vanguard of technical information management'.[13]

This link between documentation and chemistry was also reflected in the exponential increase in both chemical literature and patents. The proportion of chemical patents had grown significantly in patent offices. For instance, the US Patent Office reported that it had increased from one chemical patent per thirty patents issued in 1907 to one in five patents in 1950.[14] Although this notable increase facilitated a narrative of an 'information crisis' in the post-war years, the paradox here is that the very same narrative was promoted by these information providers.[15] To this end, their subscription-based services promised tools through which the desire to order patent information could be constantly updated and refined, and hence actualised. Although the interest in patent and chemical searches had existed since the beginning of patent offices, the post-war environment augmented the desire to locate and abstract patents, mirroring the legal entanglement between chemistry and industry visible in the protracted worldwide litigation around Ziegler patents.[16]

Derwent was the epitome of a patent information provider but not necessarily unique. In fact, it may be productively compared with other information science enterprises that emerged during the 1950s and 1960s, which were also set up by chemists or worked with information related to chemistry. Certainly, it is reminiscent of the Institute for Scientific Information (ISI), founded by Eugene Garfield, who had a degree in chemistry and set up a consultancy service geared towards this area. His chemical training has been described as 'significant to the history of citation indexing' and contributed to his 'dream of a unique chemical information'.[17] But, more specifically, the way the US Patent Office organised and indexed chemical patents particularly appealed to him.[18] One of the early projects in which Garfield participated aimed to solve the problems that chemical indexing presented for patents, a task that involved encoding all new steroids for the office under a contract with the Pharmaceutical Manufacturers' Association.[19] Monty Hyams also had a degree in chemistry, and the first patent databases his company (Derwent) developed focused on chemical nomenclature.[20] Such a background seemed almost a prerequisite for information scientists, extending beyond Garfield and Hyams to many others whose career trajectories and start-up companies were fashioned in a similar manner, with varying degrees of success.[21] For instance, Francis Narin, director of Computer Horizons, Inc., fitted the profile and ended up combining patents and citation data in his work.[22] So also Samuel Wolpert, founder of Predicasts, Inc., who used his specialist knowledge of chemistry (and electronics) when providing business information.[23]

In sum, chemistry occupied a central position for these information providers because chemical patents lent themselves more readily to classification and abstract than electrical or mechanical patents.[24] It was its organisation around classification and nomenclature and the economic growth of the discipline that paved the way for these information ventures. Interestingly, this expansion fostered a shared belief among these information entrepreneurs that 'the chemical information marketplace [was] a truly international one'.[25] Chemical patents, 'like music and mathematics, [were] blessed with symbols and formulas that know no boundaries'.[26] Moreover, the information departments of chemical companies had the capacity to finance these information projects, enabling them to lead the way in the use of technological devices, such as magnetic tape, microfilm, and punch cards, to organise and maximise information resources to meet the challenges of chemical coding. These shared interests and preoccupations meant that information entrepreneurs frequently met at conferences on chemical literature, such as those organised in the 1960s by the American Chemical Society or the British Chemical Society.[27] It was after a presentation by Hyams at one of these events that Garfield observed, 'there can be no doubt that the high importance of patents makes this a very good field in which to operate'.[28]

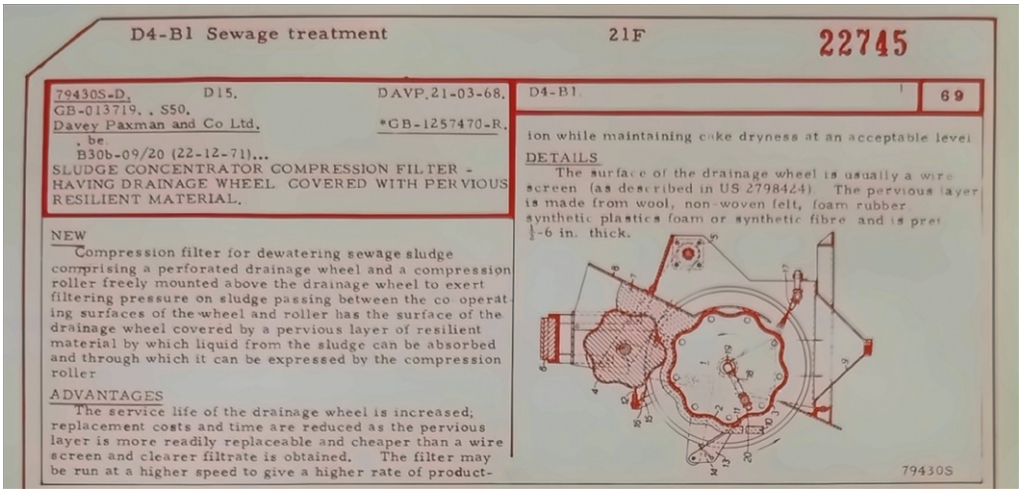
Call for abstracts

Although the special characteristics of chemistry triggered the emergence of patent information services in the 1950s, the distinct products merchandised throughout the following decades also deserve some attention. Translation, indexing, and information abstraction constituted business opportunities for all these private ventures. While these activities characterised the development of scientific communication in the post-war era, they became especially significant for patents. After all, is it not the case that abstracts constitute a foretaste of, or a substitute for, a mass of documentation that is difficult to follow? And what is more difficult to follow than patent documentation in different territories in the absence of an international patent infrastructure? It is true that the practice of abstracting and summarising patents was there from the very beginning of patent offices because abstracts constituted a doorway to patent information. However, their formulating was refined and they became increasingly widespread over the course of the twentieth century. Refinements and ubiquity were important in terms of both their legal significance and their appeal to readers in the private sector who wanted to get a bird's eye view of a given field of technology. Such discerning gaze was so attractive that even the US Patent Office entertained the project of having 'field' search rooms in its premises.[29] Although that spatial division never materialised, the development of patent abstracts tried to fulfil the desire for a selective look-up for patents, encouraging distinct, faster, and more convenient reading than official patent gazettes could yield. It is not a surprise, then, that patent abstract columns in technical journals, patent abridgements issued by different trade associations, and patent summaries or excerpts made internally by private companies evolved as ordinary tasks in patent-related work.[30] As one contemporary commentator observed, these tasks were part and parcel of the endless quest to tame the patent information tiger.[31]

The main method adopted to achieve this was the preparation of résumés or summaries of patent specifications which provided the gist of the document without any form of interpretation or criticism. While the work of patent abstracting was originally adopted by

some patent offices as part of their public service remit, many private corporations had begun creating their own abstracts directed towards their commercial interests.[32] In other words, patent abstracting had been carried out both within and beyond patent offices. However, as the process was costly and labour-intensive, some companies shifted the burden of producing patent information in abstract form to their trade associations and then to external information providers such as Derwent (Figure 1).[33] As it turned out, information providers like Derwent became such specialised abstracting agencies that some firms that subscribed to their services ended up recruiting people who had worked there for their patent departments.[34] A cursory glance at newspaper job advertisements in the 1960s reveals that need to recruit information scientists in the patent departments of companies like Unilever, Reckitt, and Imperial Chemical Industries.[35] What this trend seems to indicate is the coming of information science to patent departments as a consequence of the emergence of these intermediary patent documentation services. Since they provided distinct ways of reading and accessing patent materials, they also stimulated firms to incorporate further analytical skills for their internal patent procedures. One of the interesting features of the professional space carved out in patent work was the division of labour on which it was built, distinguishing between manual and mental labour.[36] The gendered language in some of these advertisements is as clear as the reminiscences of a patent information worker in the 1960s who observed how clerical work was reserved for women while management, evaluation, and analysis tended to be performed by men.[37]

In contrast to the abstracts provided by patent offices, the new abstracts produced by external services were characterised by their publication speed, enhanced legibility, and suitability to industry demands. While abstracts provided by offices were slow and came after the publication of gazettes, Derwent and other information entrepreneurs began to produce abstracts, when it was possible, directly from the patent specification, that is, before publication.[38] This operation shifted the source from which abstracts drew their material, accelerating access to patent information. Similarly, when patent office procedures moved to publication before examination, these intermediaries adapted the way abstracts were produced and paid more attention to questions such as editing, identification, and disclosures.[39] What made the abstracts notable was not only the way in which they were adjusted to legal changes but also how they differentiated themselves from the overlapping official literature issued by patent offices. For instance, they were celebrated as being more informative than the abstracts published by the French Patent Office (usually prepared by the applicant). And they were understood to be more readable than the ones issued by the British Patent Office, which evidenced the opposite problem as they were drafted by patent examiners and were considered too detailed and complex for the average reader. For that reason, these new and more accessible abstracts attracted some criticism from patent agents in Britain – for being, as it were, too simple.[40] This controversy is interesting because it shows that the contest over abstracting patents revealed the constitution of a professional market for patent literature that could threaten the incidental work previously undertaken by patent agencies.[41] Drafted in 'easier' or more informative language, these new privately produced abstracts offered rapidly published summaries, overcoming criticisms concerning timeliness because their preparation was constantly improved to foster and feed an appetite within industry for patent information.[42] What the new abstracts had in common was that they minimised note-taking at the patent office, and that was a key factor in their success. Another aspect to emphasise is that the main difference between the services was the private and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SLUDGE CONCENTRATOR COMPRESSION FILTER - HAVING DRAINAGE WHEEL COVERED WITH PERVIOUS RESILIENT MATERIAL.

NEW
Compression filter for dewatering sewage sludge comprising a perforated drainage wheel and a compression roller freely mounted above the drainage wheel to exert filtering pressure on sludge passing between the co-operating surfaces of the wheel and roller has the surface of the drainage wheel covered by a pervious layer of resilient material by which liquid from the sludge can be absorbed and through which it can be expressed by the compression roller

ADVANTAGES
The service life of the drainage wheel is increased; replacement costs and time are reduced as the pervious layer is more readily replaceable and cheaper than a wire screen and clearer filtrate is obtained. The filter may be run at a higher speed to give a higher rate of product-

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ion while maintaining cake dryness at an acceptable level

DETAILS
The surface of the drainage wheel is usually a wire screen (as described in US 2798424). The pervious layer is made from wool, non-woven felt, foam rubber synthetic plastics foam or synthetic fibre and is pref ⅛-6 in. thick.

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Figure 1. A typical Derwent patent abstract. *Central Patents Index: Instruction Manual* (London: Derwent, 1972). Reproduced with permission of City, University of London Archive.

commercial nature of information ventures such as Derwent, as against the non-profitable basis of patent abstracts previously made by patent offices and other agencies and associations.

Profitable lives

Among the marketing techniques used by Derwent to attract subscribers was the sending of abstracts directly to the firm that had filed particular patents, and to its competitors. For instance, Kodak received not only abstracts of its own patents but also those of the patent filings made by Agfa. By mailing the abstracts to targeted potential readers, attention to these services was instantly grabbed. Yet the most immediate consequence was the desire to know about patents as information sources for a variety of purposes. Another interesting marketing strategy often used by Derwent was the inclusion of brief notes on patent procedure in the various countries covered by its services.[43] What can be seen here is the way in which technical and legal issues coalesced when patent information was merchandised. When information was packaged and disseminated, patents were read, ordered, and thought about differently. Although this might seem a trivial or banal issue to highlight, it had an obvious impact not only on the possibility of citations of prior art but also on litigation, since many legal cases would not have taken place if these alerting services had not existed.[44] However, we would like to emphasise the link between technology and information that characterised these services from the perspective of their overall impact on the patent system. It is possible to say that technical solutions to concrete problems in the handling of information defined Derwent's trajectory, as they evidenced the possibility of doing the same business but by more efficient methods. In other words, the dissemination of patent information, including the way patent offices thought about it, started to run as a business and was increasingly defined by market imperatives. The question remained of who was to bear the risk involved, since previous attempts were not as profitable as anticipated, with private firms frequently going bankrupt.[45]

By looking at the development of these new information ventures that emerged in the post-war years, we can gain a sense of how patents began to be accessed and read differently, via shortcuts and through distinct media such as cards, microfilms, and tapes.[46] These private for-profit companies like Derwent adapted to the new technologies and capitalised on their potential for patent information business. One notable aspect is that the different media through which their services were offered also promoted a vision of greater access to patent information via machines. As the most attractive characteristic of these ventures was speed, perfection was not as important as standardisation. More than two decades after Derwent had started its information business, Hyams was still suggesting that the main problem for the information industry around patents was the lack of standardisation of patentee names, classification, and priority information.[47] In that sense, Hyams criticised projects in Europe and Japan that aimed for perfection in terms of translation and argued instead that 'all that we translators of foreign language abstracts really need is a fairly rough translation which we then can knock into shape – we can decipher the synonyms, homonyms and the like using the expert system that God provided us with'.[48] In a similar vein, he asserted that 'in the future all scientific articles may be converted by an automatic translation program into a standardised language – probably American English – before being placed online for international access'.[49] While Derwent was very much a product of technology,[50] its service relied heavily on manual and automated labour, with the employment, as late as 1980, of nearly a hundred home-based typists and information workers.[51] Because of its position as an intermediary that relied so much on this type of factory production and labour, technological changes constituted both an aspiration and a cause for concern, for they threatened to destabilise the business model. The appearance of new devices, like discs, tapes, or computers, offered new prospects but also significant transference and formatting costs, and therefore the danger that its patent information services could become obsolete. It is interesting to see how, despite the fact that Derwent moved to online services in order to adapt to new media environments, Hyams lamented that 'the database producer has become a slave to the new technology'.[52] Here we can see that the narrative of an 'information crisis' defined the ethos of such entrepreneurship, which always looked to how new technologies could help or hinder it in the future. The shift to a subscription-based business model is connected to this strategy. Instead of selling information commodities, these ventures offered subscriptions so that they could maintain an income stream while they adapted to technological changes. What is interesting to note here is that this trend was shared by all information entrepreneurs, because technology was the condition of possibility from which they had emerged.

Data extraction

Many of the scientific information companies that started in the 1950s and 1960s had humble beginnings. Garfield's ISI started its operations from a converted chicken coop on the Pennsylvania–New Jersey border, not far from Philadelphia,[53] while Hyams operated from his own London home, the name of which, Derwent, he used for his company.[54] As indicated above, both companies began providing condensed information by abstracting the contents of a variety of scientific publications, such as patent and academic journals. Despite or possibly because of these modest and local beginnings, their aspirations and ambitions gradually shifted to global projects that could overcome national or regional limitations, much in line with the dream, shared by earlier thinkers such as Paul Otlet or Wilhelm

Ostwald, of creating a worldwide information service.[55] Although these efforts are often discarded as utopian thinking, they materialised in commercial ventures like Derwent. The most immediate transforming effect was that they served to construct and foster a specific type of reading of patents, one that allowed browsing and skim-reading. This way of reading patents not only characterised searching for novelty, but also facilitated similar activities in relation to potential infringements or competitors' strategies. What defined this way of digesting and providing customised patent information was that it enabled the interested reader to be 'on alert'.[56] There is much to be said about this shift and how it contributed to the development of a cautionary reading.[57] However, we would like to consider several factors that made these entrepreneurial projects based on patent information particularly noteworthy.

While the history of Derwent seems to follow the typical corporate trajectory of incremental steps, hard work, and good contact with customers, it was also the result of minor breakthroughs that came with the seizing of concrete business opportunities. One of these was the recognition of the need for rapidly produced abstracts alerting interested parties to new British patents, which the company began publishing in the early 1950s.[58] But the most significant development was triggered by the realisation that patent information was being made available earlier in Belgium than in other countries, which Hyams immediately recognised as a significant breakthrough for his own commercial venture.[59] Belgian patent literature was open for public inspection almost instantly, unlike that of other countries, but only a single copy was available, and this could be read only at the Patent Office in Brussels during the short working day.[60] This availability ahead of print meant that Brussels became a required destination for those interested in patents, as some solicitors and bureaux quickly grasped.[61] As early disclosure was strategically vital for chemical patents, the abstraction of the patent literature as soon as it was available in Belgium gave Derwent a leading position in the incipient market for patent information products and services.[62] Hyams understood these contingent circumstances as being key to his entrepreneurial success. Indeed, he found it 'advisable to think up an entirely new concept, such as the citation index; to exploit areas ripe for expansion, such as recent inroads into economic abstracts; or to take advantage of special situations, such as the publication of inventions in Belgium far earlier than their counterparts in any other country'.[63] The *Belgian Patent Reports* also began to be cited in legal cases concerning the revocation of patents, as they were used in court to consider the dissemination of information and the concept of publication in patent law.[64] What made these patent reports interesting is that promptness was a significant driver in their publication, evidencing a new approach to the charting of patents internationally.[65] In that sense, they became valuable as early disclosures of corresponding applications pending in other countries.[66]

Patent families

As a response to the growing need to obtain and channel patent information globally, Derwent's reporting activities were fundamental to the early success of the business. But the company's most remarkable development was a distinct form of organising and processing the material it gathered, typed, and marshalled to search for priorities. This came to be known as the 'patent family'. Hyams described it as follows: '[I]nstead of reporting individually on the same invention as it came out in different countries, once a first member was published

(which I called the parent), subsequent filings in other countries were referred back to the parent, saving a lot of time and space in abstracting and registration'.[67] Interestingly, this was an invention premised on inventions, a way to organise patents by grouping them via equivalences or concordances between abstracts.[68] The main effect was the ability to recognise that 'subsequent patents could be referred back to the first, or parent, publication'.[69] Although such an operation could be traced to the early visits to Brussels, it appears that its full significance and usefulness came much later, probably as a result of solving practical problems in the routine work of producing patent information. In fact, the operation that allowed for the detection of concordances between patents arose from the reports themselves, since links and associations were embodied in the process of their being made.[70] A family (or cluster) signified the existence of a first patent application invoking priority of the same patent application under the Paris Convention for the Protection of Industrial Property (1883).[71] This footprint characteristic made the indexing programme developed by information entrepreneurs such as Derwent a significant search tool for tracking trajectories (or routes) of patent applications throughout the world.[72] In that sense, families (or family material) were produced by secondary operations that connected worldwide information about patents.[73]

To some extent it is possible to consider its internal logic as analogous to other well-known information products of the time, such as the citation index developed at the ISI. Both paid particular attention to the links between documents, making them legible to a new type of reader (or user) more interested in those associations than in the specific patent specification or the periodical scientific article. In that sense, the merchandising of information forged new interfaces between users and the system. More specifically, it enabled companies to identify patents of a firm in a defined area, facilitating what is now called 'patent intelligence'. This possibility emerged from the collateral effect of patent reports being accumulated that prompted the need for retrieval systems to make them useful. Here we can see how the crisis narrative defined these for-profit ventures. They constantly constructed a sense of dissatisfaction with the state of patent information so that their subscription services could come to the rescue. After all, what were these services if not tools to organise patent information? More to the point, it is possible to say that the desire for new services was nurtured by the very same reporting operations that had inundated patent departments and offices before. Instead of ordering patent information by country, this correlation of information also enabled other possibilities for the selective arrangement of patent abstracts, for instance by field or sector – a desire incidentally expressed by different potential subscribers to Derwent services.[74] Similarly, this informational elasticity meant that different search logics and strategies could be carried out and tuned in according to subscribers' needs, thus opening a strategic patent horizon that was unthinkable before the advent of these information enterprises.

Eventually, Derwent would multiply its services, including products such as Farmdoc (1963), Ringdoc (1964), Agdoc (1965), and Plasdoc (1966) that, as their acronyms suggest, referred to patents in the pharmaceutical, agricultural, and plastics industries.[75] What characterised such publishing operations was the way they built a comprehensive portfolio of services through the selective coverage of patent information. The immediate consequence of this *à la carte* publishing output was an augmented interest in knowing about patents for different purposes. By customising information about patents according to specific segments or fields, subscriptions from pharmaceutical, agricultural, and oil-related companies grew

because of its convenience. But, more importantly, the desire for patent information in some of these companies arose by virtue of the publishing services themselves, since separating the wheat from the chaff was previously perceived as an expensive, burdensome, or uninteresting task. A number of these patent information services had their origins in agency arrangements with trade associations like the American Petroleum Institute and the European Pharmaceutical Manufacturers.[76] Those arrangements enabled abstracts and indexes to be standardised.[77] In that sense, chemical and pharmaceutical manufacturers helped to develop a coding system, configuring a substantial part of the indexing programmes that would enhance the services offered by Derwent throughout the 1960s. These specialised services to reduce costs and provide retrieval capability were later incorporated into the database services that constituted the Central Patents Index (1969) and the World Patents Index (1974).

As the premise of the indexing programmes was to permit multiple and derivative uses of the patent material processed and prepared by Derwent, their variety and elasticity meant that they enabled the expansion of coverage to communicate and retrieve patents of interest to potential readers. The extension and usefulness of this secondary patent material (indexes, abstracts, reports) derived both from how it was arranged and from its cumulative character. As such, it overlaid and improved the official literature about patents issued by national patent offices in a variety of ways. Firstly, the information products and services produced an alternative memory for the search and retrieval of patents.[78] As they offered clues for the identification of patents of interest, the likelihood of dissemination and recollection in the future increased. Secondly, the search and retrieval power promised fostered a particular taste for patent information, one that accustomed users to look for the best way of monitoring it. And thirdly, subscribers to these services were encouraged to use their influence to ask for improvements in the publication standards of patent offices. What became apparent in exchanges between subscribers, commercial information entrepreneurs, and patent offices is that these information services and products affected the information transfer chain, emerging as a distinct recursive medium that turned out not only to be shaped by but also to shape official publications. The impact of these new information services was such that even some contemporary commentators catalogued them as official publications, as they were relied upon to an increasing extent by all parties interested in patents.[79] Even more interestingly, the success of these secondary sources placed patent offices in an awkward position because their examiners began leaning heavily on them for their own searches of primary sources.[80] Similarly, the International Patent Documentation Center, founded by the World Intellectual Property Organization (WIPO), became increasingly interested in including Derwent accession numbers in its files.[81] By the end of the twentieth century, the overlap paradoxically caused some commentators to criticise the policies of the offices as 'leading to a progressive destabilisation of the patent information market'.[82]

Information retrieval

The Central Patents Index was an information tool issued by Derwent that was intended to gather all patent information in one place (Figure 2).[83] Mainly consisting of abstracts averaging approximately 150 words, it provided both documentation and current awareness alongside alerting services that facilitated opposition to and monitoring of patent activities. What made the index significant was that it enhanced the effectiveness of abstracts by mounting them in classification order, instead of alphabetically. In that sense, it was designed

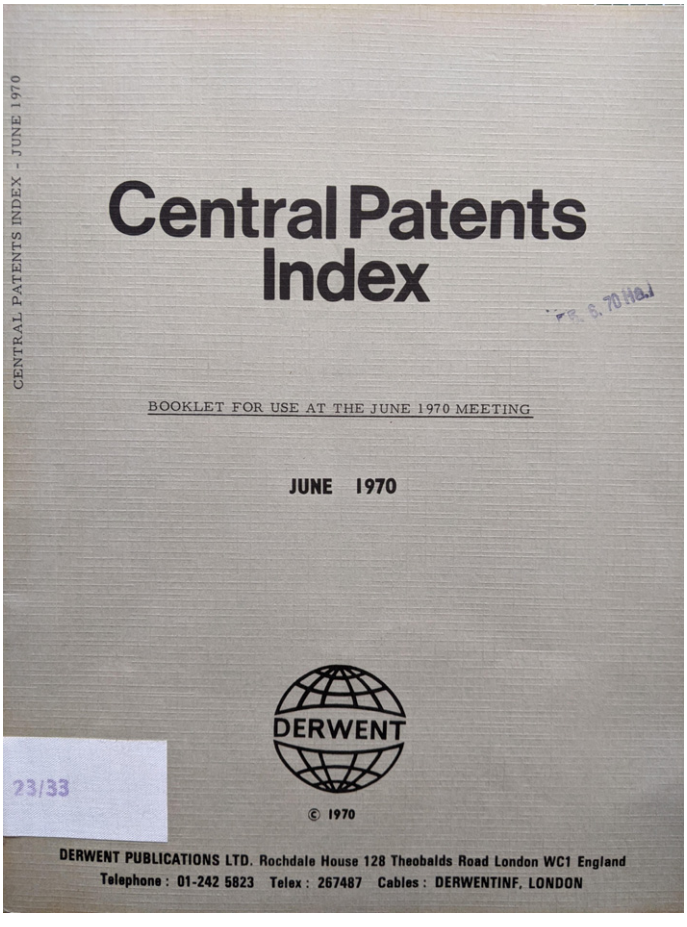

Figure 2. Cover, *Central Patents Index*, © Derwent 1970. Courtesy of Bayer AG Archiv.

to help the reader navigate the practical difficulties emerging from different patent bureaucracies, that is, to 'meet the challenge presented by the new patent procedures in the Netherlands, Western Germany, France and soon Japan with their attendant problems, due to deferred examination and mass publication of complex documents of uncertain inventive merit'.[84]

The index was described as 'impressive' by other information entrepreneurs, such as Garfield,[85] and led many lawyers and patent agents to define Derwent as 'probably the best source of information' about patents.[86] Although it was a considerable publishing achievement to crack the international patent problem of how to handle masses of scattered publications issued by national offices, its most notable feature was its character as a service, and not just an end product. In other words, it was a tool that evolved into a range of information products facilitated by a subscription-based business model.[87] This business model enabled a method of obtaining user reactions in so far as subscriber meetings, user manuals, instruction classes, and questionnaires created a sense of community around the index.[88] Indeed, many of the services offered by Derwent were produced through close interaction with its users and customers. For example, in one interview, Monty Hyams's younger son, Stephen, reflected on how this materialised: 'I believe the coding system

originated from the subscribers. I know my father did not make it up, but they worked closely with the subscribers to develop the system that they wanted'.[89] Charles Oppenheim, an information scientist and a former employee of Derwent, also highlights the central role of users and customers in the development of this secondary market for patent literature.[90] As retold by Gore, a key meeting was held in Italy when developing Farmdoc, and eventually led 'to the famous Derwent Subscriber Meetings which became required conferences for all concerned'.[91] This emphasis on user collaboration is also evident in the accounts of how the indexing programmes were formulated and driven by the demands of subscribers.[92] However, creating the indexes involved complicated negotiations with national patent offices. By the early 1960s, Derwent had already accumulated a considerable amount of data through its earlier products, and had the experience and resources to construct an index that soon came to cover patents from countries all over the globe, including the Soviet Union, Japan, the United States, Argentina, South Africa, and many European countries. The Central Patents Index was in a sense related to a first attempt to establish an official index under the aegis of WIPO in the mid-1960s, a project that was initially frustrated by the lack of support from official institutions.[93] The Derwent index was then a privately produced information resource that gathered international information about patents and was developing a multiplicity of services that could be 'correlated'.[94] Instead of being a static and permanent index, it compressed and converted patent documents into a flexible information-based resource, centralised through a master file that Derwent continually updated.[95] The existence of a master file meant that it offered not only current awareness but also retrospective searching capability. As such, it could be said that it constituted an international patent database allowing searching operations to be performed around patents and across boundaries, directing attention to them for further uses, such as market intelligence, patent filing strategies, and litigation tactics. Furthermore, the system of communication in patents gradually shifted towards a different institutional configuration that depended on these information activities. This secondary or derivative literature began to be regarded as the main gateway to patents, and one that offered better or more efficient access than the doorways of specific national patent offices. This was particularly evident in relation to chemical patents, where the coding of subject matter was more in-depth and extensive than the International Patent Classification.[96]

Indexing principles established by Derwent were the result of ongoing interactions with users and providers of patent documents over the years. They were developed to overcome the key jurisdictional problem shaping patents, namely, the lack of a worldwide centralised issuing authority. Although this obstacle had become more and more pressing after the Second World War, once multinational corporations increased their operations in different territories,[97] Derwent analysed their logistical anxieties.[98] For instance, it negotiated know-how and licence agreements with them to enable access their patent information systems (Figure 3).[99] This meant not only that users contributed either financially or operationally, but also that user needs and subscription points shaped the coding systems developed by Derwent.

Perhaps the most significant manoeuvre to occupy that intermediate position between patent users and patent offices, and hence achieve an international dimension, was the negotiation that Derwent carried out with patent offices. While the possibility of a World Patents Index funded and sponsored by an international organisation such as WIPO failed, Derwent had already begun building its indexing programme in the 1960s and 1970s. This

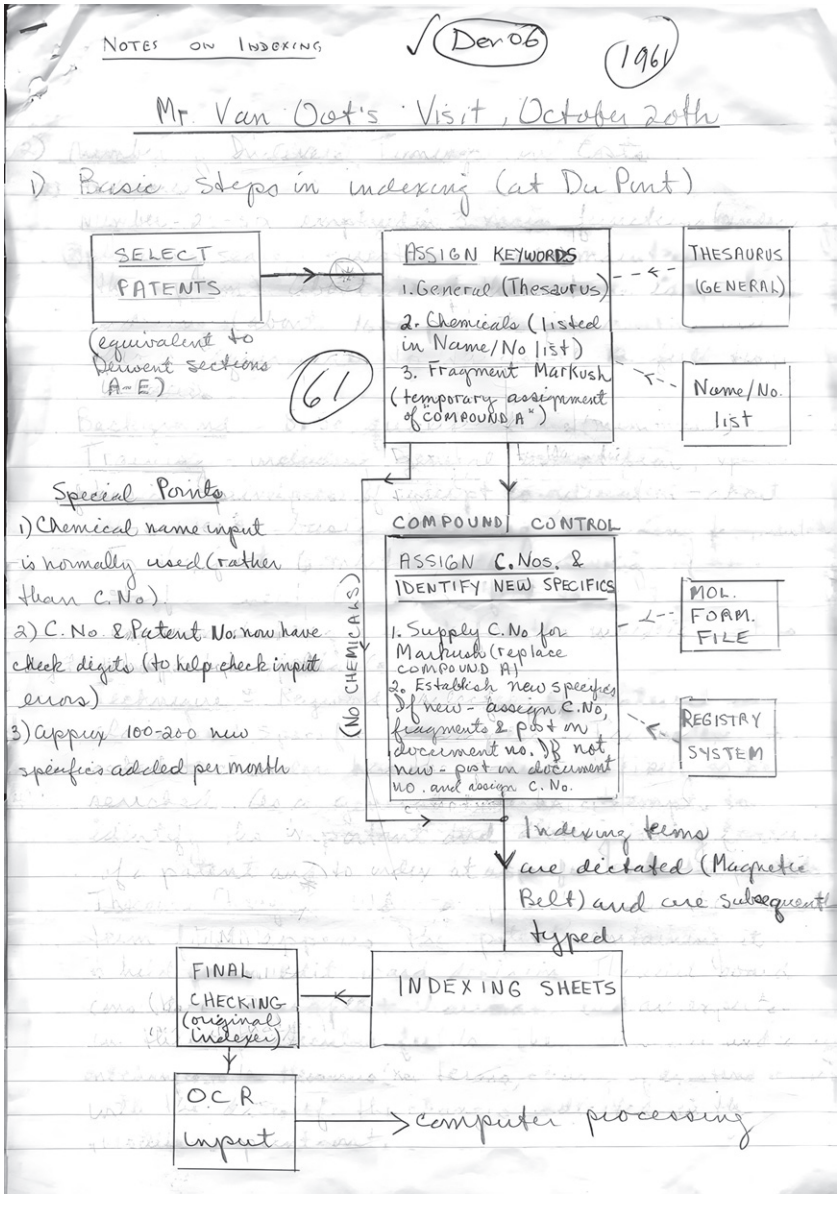

Figure 3. Basic steps in patent indexing at Du Pont (notes by Hyams/Mr Van Oot's Visit, 20 October 1961). Monty Hyams Archive, City, University of London.

was not undertaken with an international organisation but through exchanges of patent information with national offices.[100] Progress was initially far from smooth, as some patent offices were reluctant to give access to their files and to allow publications to be processed and treated. For instance, the Norwegian and the German offices looked askance at the idea of giving a private company the task of constructing such an index, but seemed not to mind if Derwent did this on its own with the patent material publicly available. While this no doubt reflects the persistence and business acumen of specific information entrepreneurs, the key element was a creative entrepreneurship that underpinned these projects. It was the dynamic

ability to be responsive to media and legal changes and infrastructural challenges that made Derwent remarkable.[101] Instead of dwelling on problems, Derwent converted these into opportunities and developed means of circumventing obstacles. One example of these strategies concerned the detailed arrangements with the US Patent Office under which initial reservations were overturned and access to patents for processing granted.[102] By the late 1960s, the US Patent Office allowed Derwent to utilise not only sets of patents issued by them but also those that had been supplied to them by other countries' offices, such as the British Patent Office. In return, the US Patent Office received expedited data from Derwent, including patent abstracts, for use in compiling its search files.[103] Although some patent offices raised doubts about the ethics of such backdoor use and exploitation of their records, the reciprocity was so useful that many of them ended up using Derwent literature in their internal patent searching and retrieval.[104]

The World Patents Index was launched in 1974. One of the differences between this and the Central Patents Index was its coverage, showing that the index proper was open to exploring different and more efficient methods of compilation. This later service was not only concerned with chemical and chemical-related patents but expanded to cover electrical and mechanical patents. The frequency of the products and services provided by Derwent was also adjusted and often revised both to defeat competitors and to satisfy patent information usage. The layout of the material considered factors such as type, legibility, and size to facilitate skim-reading or browsing, channelling readers' attention in particular directions. This ability to identify and select patent information was the main result of the market for secondary literature on patents. This market succeeded because it relieved national patent offices of the burden and cost of processing patent information on an international scale.

Mergers and acquisitions

In a talk delivered at the Information Industry Association meeting in 1980, Hyams devoted a considerable part of his speech to discussing different ways of 'catching up with the Americans', expressing great hopes for how Euronet, then a recently launched attempt at a European internet from the European Commission, would help in counteracting American information dominance.[105] The notion of a rivalry between Europe and the United States was also picked up later by Hyams, who discussed the need for 'Europeans to stand up against American domination of the market'.[106] In so doing, Hyams identified language barriers and insufficient telecommunication as important causes of the fragmented European market. According to him, these were also important reasons why Euronet failed. However, despite the challenges he remained optimistic when concluding that Europe 'isn't doing too badly in the scientific information marketplace'.[107] Although there were some tensions around the different services provided and how these overlapped, conversations between Derwent and its American counterparts were mainly about possible collaborations, mergers, or even takeovers.[108] For instance, Hyams tried to persuade Garfield to sell his company to the Thomson company, just as he had done in 1966.[109] A sort of commercial or collegial relationship developed throughout the 1960s and the 1970s between some of these information entrepreneurs, born partly of attempts to protect their business ventures.[110] Garfield had helped Hyams to stop pirates in America from copying Derwent publications.[111] Patent abstracting services were highly vulnerable to piracy because of their telegraphic characteristics. Their value came not only from their content but also from the speed with

which patent information was made available. Consequently, thwarting pirates, or finding common enemies, served to forge alliances between private information concerns on both sides of the Atlantic. There is some irony in this, as one of the accusations levelled against them at the beginning of their information enterprises was that of piracy.[112] In any case, as the business of information was always on the move, they continually explored possibilities for collaboration, sharing resources, or building up new projects such as a chemical business database.[113]

One notable aspect that shaped that relationship was the possibility of their businesses – the ISI and Derwent – merging or being bought by a third party with considerable financial resources, namely Elsevier or Thomson. In fact, Thomson tried to use Hyams as a broker in negotiating a deal between the parties, and discussions about products and services from the ISI continued from 1967 into the 1980s. Interestingly, Monty Hyams was also in discussions with Samuel Wolpert, director of Predicasts, Inc., an American company selling business information, during the same period. In 1960, Wolpert started a small company in a similar way to Hyams and Garfield, and his first product was a quarterly journal containing product forecasts. Tellingly, his enterprising idea resided in the belief that 'information had to be organised and managed not because it was scarce but because it was abundant'.[114] One major feature that made this company popular was the making of 'composite forecasts', reports that aggregated and summarised the insights from several sources. Eventually Predicasts would embrace a global market by launching Worldcasts. Although the possibility of cooperation was investigated, Wolpert remained sceptical because of the rather different material the two companies covered. He highlighted that 'your present contacts would not be interested in our products, nor our contacts interested in your products'.[115] Despite that, it is interesting that Wolpert did indeed suggest to Hyams that one possible area of cooperation might be the exchange of sales agents or even that Derwent should buy out Predicasts.[116] These discussions never came to fruition, but they indicate that information entrepreneurship in the 1960s and the 1970s opened opportunities for the constitution of information networks. The ISI and Predicasts' representatives displayed a hesitant approach towards Derwent's business propositions despite Hyams' recurring attempts at establishing a commercial collaboration with American counterparts.[117] It could be argued that the ISI and Garfield also wanted to achieve status and recognition as scientific actors, and that this pursuit may have hindered further collaborative efforts. Overall, the impression is that the special characteristics of patents as documents made it difficult to establish collaborations in the information industry. It is quite telling that the acquisition of some of these services by Thomson finally brought them under the same corporate umbrella.[118]

Conclusion

When the US Patent Office published a pamphlet entitled *How to Obtain Information from United States Patents* in 1960, it estimated that to acquaint the public not only with the 'whys' but also with the 'wherefores' of patents was necessary to confound those who were attacking the patent system.[119] The logic behind the publication was that the more patents were used, the stronger and the more beneficial the system would become, so it is not a surprise that similar pamphlets appeared around the world over the next few decades. One of their main characteristics was the inclusion of references to patent literature sold by external providers

such as Derwent. These external services were patent abstracts, reports, and databases provided by private for-profit companies that shared similarities with other well-known information businesses like the ISI. What was remarkable about them was that they converted secondary literature into a primary source, as they turned out to be obligatory routes for accessing patents internationally. Although their emergence could be seen as an answer to narratives alerting of an information crisis or information overload, their businesses depended on maintaining that sense of crisis to which they could offer solutions. The commercial success of this secondary patent literature was certainly related to the budgetary restrictions of patent offices, unable as they were to provide a broad coverage of patent information at low cost. In fact, the lack of an international patent office was converted into a business opportunity, seized upon by information entrepreneurs like Derwent, who became both customer and supplier of patent information and ended up facilitating an international communication of patent matters. As a result, the commercial impetus to capitalise on the special problems of patent documentation influenced the standardisation of formats in which patents would come to be issued for decades to come.

What was the ultimate impact of these information intermediaries in the history of patent law? The crucial role that these mediators played in the construction of patent literature still looms large today. While these services raised important questions about the accessibility of patent materials once they become part of proprietary databases, their techniques of handling information brought further and more subtle consequences. As they delved into the heart of the patent system, they changed the way patents were read and the reasons for which they were read. Among these changes, the most evident was the transformation in the place in which patents were accessed, which was now increasingly outside patent offices, at one's home or office, via a subscription. This shift was in tandem with new technologies, such as microfilm and computers, that normalised a corporate way of reading patents. The business of patent intelligence and patent analytics is rooted to these ventures that selected the information that needed (or did not need) to be read. Such corporate outlook enabled a professional – the information scientist – to enter patent departments, offices, and homes, as the transfer and processing of documents out of patent offices into terminals meant that the infrastructure and the communication of patent information shifted to this secondary literature.[120]

The rise of patent families could also be seen as a logical development of this information entrepreneurship, as the possibility of linking and integrating related patents in a database came after the processing of international patent material. As well as producing families of patents from a single vantage point, the information products and services merchandised by these intermediaries had a global reach. It is not a coincidence that the trademark of Derwent resembled WIPO's logo – the window on the world promised by these services was another characteristic that defined the information entrepreneurship of the post-war era. All these companies devoted to scientific and patent information would eventually pursue the same global utopia with products such as World Patents Index (Hyams), Worldcasts (Wolpert), and the Science Citation Index (Garfield). Their shared aim was to catalogue information constantly being filed or published around the world. It might not be a surprise, then, that their businesses would end up being acquired or absorbed by larger multinational companies such as Thomson. For they could be seen as antecedents of start-ups that would appear years later: scientists developing practical applications and establishing private companies to exploit them commercially that were in due course sold to multinationals. The consolidation

of scientific and patent information into large multinational corporations arguably marked the end of an era of individual entrepreneurship, exemplified by Hyams and Garfield, who shaped the way scientific and patent information was to be handled and packaged. Presumably, the process of corporate takeover would not have been the same without the advent of the Internet, and in this connection there is one last observation to be made. The rise of online search engines such as Google™ and their subsequent dominant position in the search for information, including scientific and patent data, arguably forced curated proprietary databases to refine and customise their services to an even greater extent. But both free and proprietary databases continued to promulgate the promise once articulated by those information ventures, namely, the idea that you could have patent information at your fingertips. While the challenge of making information accessible is still part of the remit of patent offices, the rationale behind such official databases to disseminate patent information is that openness will stimulate research and development, and ultimately result in economic growth. In a sense, the trend implies a presumption that openness will reinforce the legitimacy of the patent system: the more open and accessible, the stronger and the more beneficial the system will become. However, the special position that patents occupy still benefits the bespoke, for-profit private patent information services, as they focus on user-orientated filters, reference tools, and data visualisation to navigate patent literature. These services watch and manage patent information, which seems, ironically, more and more necessary when you are not in the patent office but at home or in your office.

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Notes

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21. Brian Gore, 'Monty Hyams 1918–2013', *World Patent Information* 36, no. 1 (2014), 47–48.
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25. Monty Hyams, 'Information for Chemists – a European Viewpoint', *ASLIB Proceedings* 39, no. 5 (1987), 169–81, at 169.
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30. Newspaper and trade magazines such as *The Architect*, *Kinematograph Weekly*, *The Automotor*, and *The Cycle Manufacturer* included columns of patent abstracts specially produced by patent agents; see, for instance, 'Recent Patent Abstracts', *Kinematograph Weekly* (28 January 1937), 68; 'Patents', *Cycle Manufacturer Dealers' Review* (19 July 1902), 310. A summary of the abstract journals can be found in 'Introducing the Patents and Microtext Library' (The Manchester Public Libraries, 1959), 1, Manchester City Council, Archives and Local History, GB127. M740/8/25/2/11.
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36. 'Assistant (preferably female). ICI Fibres Limited (Patents Information Service)', *The Observer* (16 November 1969), 19.
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59. Monty Hyams, 'Foreign Patents Documentation', *Journal of Chemical Documentation* 6, no. 2 (1966), 101–23, at 103.
60. Peter Hyams, 'Monty Hyams Dies at 95', *Information Today* 30, no. 11 (2013), 11; see also Stephen Adams, *Information Sources on Patents* (Berlin: Walter De Gruyter, 2006), 128.
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62. Gore, 'Monty Hyams 1918–2013', 47–48.
63. Hyams, 'Some Problems of a Database Producer', 5.
64. Eastman Kodak Company's Patent [1968] Fleet Street Reports (FSR) 391. In this case, Hyams was called as a witness and testified that almost forty subscribers in the United Kingdom were receiving the *Belgian Patent Reports* published by Derwent.
65. 'Derwent International Patents Chart', in *Derwent Patents Manual*, 1962, MYHS/4, GB 2107.
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70. 'World Patents Index Plan: 1965–1968', 71, WIPO Archives, Geneva, E 2313G174 BIRPI.P (F/E).
71. Article 3, Paris Convention for the Protection of Industrial Property (1883). That priority applications were considered the backbone to structure the patent families can be seen in the description of the services of the World Patents Index; 'World Patents Index: Prospectus for Financing the Establishment of the System (1967)', 2, WIPO Archives, E 2313G174 BIRPI.W. Interestingly, article 50 of the International Patent Cooperation Treaty (1970) administered by WIPO referred to patent information services.
72. See, for instance, Helen Minter and Charles Oppenheim, 'Use Made of the British National Patent Route, the European Patent Convention, and the Patent Co-operation Treaty', *CIPA Journal* 9, no. 7 (1980), 328–38.
73. Hyams to Blaker, E. I. DuPont de Nemours & Company, 13 December 1971, Hagley Museum and Library Archives (hereafter HML), E. I. DuPont de Nemours & Co., box 1, acc. 2232.
74. See, for example, General Tire Company, B. F. Goorich Company, or Itek; see memorandum from J. T. Maynard, 25 March 1969, HML, DuPont company collection, box 1, acc. 2222.
75. 'Background on Derwent and Other Pertinent Data', 15 January 1969, HML, DuPont company collection, box 1, acc. 2222.
76. On the American Petroleum Institute and the cooperative effort with Derwent, see E. H. Brenner, 'Patent Abstracting and Indexing – Cooperative Efforts in Historical Perspective', *World Patent Information* 9, no. 2 (1987), 27–33. For an overview of the European Pharmaceutical Manufacturers and Derwent, see Peter Ochsenbein, 'The Patent Documentation Group (PDF)', *World Patent Information* 9, no. 2 (1987), 92–95; see also Minoo Philipp and Bob Appleton, 'Half a Century of the Patent Documentation Group (PDG) 1957–2007', *World Patent Information* 29, no. 2 (2007), 148–53, and Suhr, 'A Change of Paradigms', 42.

77. Specht, 'Informationsmanagement', 10–11.
78. Derwent's coding for retrieval of chemical structures went right back to the early 1960s, and this meant that the services offered by these information entrepreneurs superseded those offered by patent offices; see *Central Patents Index*, Derwent Publications Ltd, 1970, Bayer Archives, file 023-033.
79. Frank Newby, *How to Find Out about Patents* (London: Pergamon Press, 1967), 97.
80. Monty Hyams, 'Abstracting, Indexing and Retrieval of the Information Content in Patent Documents', in *The Role of Patent Information in Research and Development: A Collection of Lectures Given at the Moscow Symposium Organized by the World Intellectual Property Organization (Moscow, October 7 to 11, 1974)* (Geneva: WIPO, 1975), 275–88, at 275.
81. Otto Auracher to Hyams, 24 July 1981, MYHS/1, GB 2107, Letters and Correspondence.
82. Ursula Schoch-Grübler, 'Patent Offices and Commercial Patent Services: Partners or Competitors?', *World Patent Information* 17, no. 2 (1995), 85–90, at 86.
83. In the first year of the Central Patents Index, it covered around 95,800 first-issue patents from twelve countries. See K. M. Saunderson, 'Patents as a Source of Technical Information', *ASLIB Proceedings* 24, no. 4 (1972), 244–54, at 249; 'Central Patents Index', *American Documentation* 20, no. 2 (April 1969), 172; and Felix Liebesny, 'Patents as Sources of Information', in *Mainly on Patents*, ed. Felix Liebesny (London: Butterworths, 1972), 117–35, at 125.
84. *Central Patents Index*, Derwent Publications Ltd, 1970, 2.
85. Garfield to Hyams, 18 September 1969, Garfield Papers, box 18, folder 14.
86. Keith M. Dunn, 'Research Sources in International and Commercial Law', *North Carolina Journal of International Law and Commercial Regulation* 9, no. 2 (1983–84), 319–36, at 335; see also John M. Audrey, 'Discussion on Lord Eccles' "The Communication Problem"', *CIPA Journal* 3, no. 9 (1974), 304–17, at 311 (defining Derwent as 'the most efficient method of disseminating the content of patent specifications').
87. 'Subscription Conditions, Central Patents Index, 1970', Garfield Papers, box 15; see also Hyams, 'Abstracting, Indexing and Retrieval', 283.
88. D. M. Hughes, British American Tobacco Co. Ltd, to B. K. Lafferty, Subscriptions Manager, Derwent Publications Ltd, 13 December 1968 (requesting the manual and the Derwent International Patents Chart), British American Tobacco Records, DMH/MGS/PW/22A.
89. Caitlin Moore, 'The Monty Hyams Archive: A New Resource in Information Science History' (MSc dissertation, City University, London, 2016), 104.
90. 'Absolutely. I don't think there's any question of it that the Derwent club if you like, the subscribers, felt they had a relationship with, in particular Monty Hyams, and he chatted them up'; ibid., 105; see also interview with Charles Oppenheim, May 2018 (on file with the authors).
91. Gore, 'Monty Hyams 1918–2013', 47.
92. 'The History of Derwent', 2.
93. 'Project for the Establishment of a World Patents Index', Geneva, 9–10 December 1965, WIPO Archives, E 2314G174 BIRPI.PJ/48 (F/E).
94. Derwent Publications Ltd circular, 12 September 1969, Garfield Papers, box 18, folder 14.
95. That flexibility was considered to be the most important feature of Derwent products; see H. Winning, 'Derwent Activities in the Field of Patent Information and Retrieval – Present and Future', in *The Role of Patent Information in the Transfer of Technology*, ed. F.A. Sviridov (New York: Pergamon Press, 1981), 180–84, at 183; see also Alfred C. Marmor, 'What You Don't Know Can Hurt You: Inside View of Derwent – the Technological Information Specialists', *APLA Quarterly Journal* 11 (1983), 40–48, at 42.
96. P. Robbins and H. Winning, 'The CPI Manual Code', in *Derwent 78: International Patents Conference. Proceedings*, 52.
97. This meant that their foreign patent information needs were increasing, and their patent agents had to perform worldwide patent searches and watch the publications from different patent offices to keep their clients informed.

98. Hyams to Robert Blaker, E. I. DuPont De Nemours & Co., 5 April 1971, MYHS/1, GB 2107, Letters and Correspondence.
99. 'General Information System License Agreement between DuPont and Derwent Publications, Ltd', October 1971, HML, DuPont company collection, box 1, acc. 2232.
100. The negotiations were, however, so advanced that even a draft agreement between Derwent and WIPO was produced, on February 1971; 'Advisory Group on the Derwent Proposal (1971)', WIPO Archives, E 2314G17401 WIPO.AGD (F/E).
101. For the changes in patent law and how they affected patent information available for Derwent, see Charles Oppenheim, 'Recent Changes in Patent Law and their Implications for Information Services and Information Scientists', *Journal of Documentation* 34, no. 3 (1978), 217–29.
102. Frank J. Cohen to Hyams, 29 December 1969, File US Patent Office, 1969–70, MYHS/1, GB 2107, Letters and Correspondence.
103. References to these projects can be found in Edward J. Brenner, 'Patent Searching', *Jurimetrics Journal* 13 (1972–73), 150–52, and A. Donald Messenheimer, 'Patent Office Services', *ABA Section of Patent Trademark and Copyright Law: Committee Reports* (1971), 48–49, at 49.
104. A. Holt to Roland Bowen, Assistant Comptroller, The Patent Office, London, 21 August 1981, National Archives, Kew, UK, BT 209/1236.
105. Hyams, 'Some Problems of a Database Producer'.
106. Hyams, 'Information for Scientists'.
107. Ibid., 181.
108. Garfield to Hyams, 31 July 1967 (considering an ISI–Derwent relationship), Garfield Papers, box 15; see also Garfield to Hyams, 21 June 1968, Garfield Papers, box 18, folder 14.
109. For the acquisition of Derwent shares by Thomson, see Lord Thomson of Fleet, *After I Was Sixty: A Chapter of Autobiography* (London: Hamish Hamilton, 1975), 146–47; see also 'Record of a Telephone Conversation between Eugene Garfield and Monty Hyams, 25 May 1967', Garfield Papers, box 18, folder 13.
110. Eugene Garfield, 'How I Learned to Love the Brits', *Journal of Information Science* 34 (2008), 623–26, at 625; see also, among others, Hyams to Garfield, 18 November 1969, Garfield Papers, box 18, folder 14.
111. Hyams to Garfield, 27 October 1961, MYHS/1, GB 2107, Derwent & ISI.
112. Garfield to Birnbaum, 6 October 1972, MYHS/1, GB 2107, Letters and Correspondence.
113. Hyams to Garfield, 26 July 1979, Garfield Papers, box 18, folder 15.
114. Andrew Gross and Emeric Solymossy, 'Generations of Business Information', *Information & Culture* 51, no. 2 (2016), 226–248, at 233.
115. Peter Martin (European director for Predicast) to Hyams, 18 July 1977, MYHS/1, GB 2107, Letters and Correspondence.
116. Wolpert to Hyams, 4 January 1979, MYHS/1, GB 2107, Letters and Correspondence. Predicast was eventually sold in 1982 to Indian Head, which later resold it to Information Access; see Gross and Solymossy, 'Generations of Business Information', 233.
117. Hyams to Garfield, 2 March 1979, Hyams to Garfield, 29 December 1980; Wolpert to Hyams, 24 June 1977; all in MYHS/1, GB 2107, Letters and Correspondence.
118. The problems of such takeovers are discussed in Philip Mirowski, 'Bibliometrics and the Modern Commercial Regime', *European Journal of Sociology* 51, no. 2 (2010), 243–70, at 245.
119. John S. Lacey to Maurice A. Crews, 26 April 1960, NARA, RG 241, box 205, folder 1.
120. See, for instance, the European Patent Application 88113218.7 (16 August 1988) and the search report including a Derwent Japanese Patents Report (1970).