A Brief History of the *Llull DB* and Its Derivatives

Anthony Bonner, Albert Soler, Lola Badia
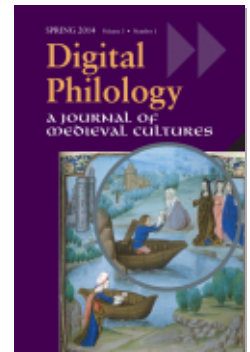
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Anthony Bonner
Albert Soler
Lola Badia
Universitat de Barcelona

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▶ This article explains how the *Llull DB*, a database devoted to Ramon Llull's original works, apocryphal corpus, historical reception, and modern scholarship, was conceived and developed. In addition to addressing specific issues involved in the design of a database with a focus on the medieval author of a multilingual corpus that enjoyed a wide reception, this essay also shows how the *Llull DB* has provided the original template for a series of interconnected databases related to medieval Catalonia, and tackles the challenges posed by the need for an interoperative environment for all of them.

The *Llull DB*

Thirty years ago, trying to get any kind of command of Lullian bibliography was a far more daunting task than anybody can perhaps now imagine. Here was a figure out of the usual scholarly stream who had not only written some 265 works, but to whom in addition were falsely attributed over 600 works (alchemical and otherwise), not to mention the innumerable works written about him and his thought by his followers between the fourteenth and the eighteenth centuries, which often circulated in the same contexts as the other two categories. Now this roster of over a thousand works has come down to us in the multitude of languages in which they were written or translated during the Middle Ages: Catalan, Latin, Occitan, French, Italian, Spanish, Hebrew, and Arabic. A peculiarity of Llull is that, while he rarely cites other authors, he frequently cites other works of his own. These auto-citations have proved invaluable for establishing questions of authenticity and chronology, and are thus an important part of Lullian bibliography. Another

peculiarity of Llull is that many of his followers, beginning with his disciple Thomas Le Myésier in 1311, published catalogues of his works which are important for determining questions of authorship and circulation of his works, and which now, together with inventories, add up to some 150 lists.

Now all these works (and catalogues) have been transmitted to us in some 1300 manuscripts found in 168 libraries from Palermo to Uppsala and Aleppo to Cincinnati, as well as in an uncounted number of printed editions beginning in 1475. Moreover, the bibliography *on* Llull is enormous, today containing some 7,000 items. This is some three times more than existed thirty years ago, but even then it was a daunting mass of material. There were, to be sure, many catalogues of works, descriptions of manuscript collections, bibliographical guides, etc., but each of these only dealt with a specific corner of the total picture, in varying degree of completeness, and sometimes even with conflicting information. Finding one's way through this jungle was an extraordinarily complicated task. All of us working then had to create massive sets of file cards, one on works, one on manuscripts, and another on printed editions. These then had to be cross-indexed, each work citing the manuscripts and editions in which it appeared, each manuscript or edition card citing which works it contained. A scholar wanting to undertake the edition and study of one of the longer Lullian work with a complicated multilingual tradition could find himself dedicating almost an entire year gathering the necessary material, consulting all sorts of bibliographical guides, going to different libraries in search of studies and editions, requesting microfilms of manuscripts, and making a necessary visit to the Raimundus-Lullus-Institut of Freiburg.

When Anthony Bonner bought his first computer in the early 1980s, he discovered that it might be able to provide an instrument that could help solve this problem, one that involved what are called relational databases. These were usually presented as tools allowing a business not only to store, for instance, one list of customers, each with his name, address, telephone and fax numbers, etc., another of products, with sales price, quantity in stock, etc., and a third of manufacturers and distributors. The firm could thus easily find out, for example, what products of which manufacturer had been bought by which clients. Professional programmers indicated that the best program for this purpose was dBASE (this was the epoch of the operating system DOS). A few years later an improved version called Clipper appeared on the market, and it was on these two forms of what was essentially the same programming language that the *Llull DB* was initiated.

To work this out with Lullian bibliography, it was clear that one would have to begin with four lists—works, manuscripts, printed books, catalogues—and then relate the first to the last three. Properly done, this would mean that having entered the works present in a given manuscript, edition or catalogue, automatically the database could be consulted for those works to see in which of the three they appeared. This presented two enormous advantages over the traditional file cards. The first was the automatic connection between different sets of information, and the second that each such connection only had to be entered once, thereby decreasing the labor involved and the chance of errors.

It seemed logical to begin with the catalogue of works that had been prepared for Llull's *Selected Works*. For each work a form, as it were, was filled out giving its catalogue number, title, date, and place of composition, other works it cited, incipits and explicits, bibliography and miscellaneous commentaries. To this were added slots in which eventually would appear whatever manuscripts, editions, or catalogues carried the work. Once the authentic works had been entered (the spurious works would come later), the task of entering manuscripts, editions, and early catalogues could begin. In the case of editions, for instance, this meant that having filled in the required information concerning editor(s), title, place of publication, date, etc. (or in the case of manuscripts, city, library, collection, shelf mark), the program would ask if it contained an edition of works. An affirmative answer brought up new forms on which one could enter the works with their catalogue numbers, the language in which they were here printed, and the pages (or folios) each occupied, information which would then be automatically available when consulting the work involved.

Entering this enormous mass of material was a formidable task, which would have been impossible without the collaboration of a host of graduate and scholarship students, first in Majorca and then in Barcelona (whose names are given under the heading of "Credits" in the *Llull DB*). It was through the coordination of Lola Badia and Albert Soler of the University of Barcelona that most of these collaborators were brought into the project, and that it began to be reorganized from a solitary product to a collective endeavor. It was thanks to this collaboration that, for example, all the items of the classic bibliography by Rogent and Duràn, with its continuations (Brummer; Salleras), were entered into the *Llull DB*. And it was thanks to them (and especially Joan Santanach) that the majority of manuscripts containing authentic works were finally entered.

The program had reached a point where it could have been useful to others, if it weren't for some major hurdles. The program itself had been written by an amateur, and in the operating system, DOS, which was clearly on its way out. It was difficult to use, and it was subject to frequent breakdowns which needed to be resolved by nervous telephone calls or e-mail exchanges.[1] This meant that the *Llull DB* as it stood was practically unusable for an outsider, and even for some insiders with a low level of toleration for computer problems.

The only possible solution was to find a professional to recast the program in a more reliable and user-friendly form; but this proved much more difficult than any of us had imagined. Professional programmers were trained to deal with scientific or engineering matters, or with practical problems such as warehouse inventories, stock market quotes, personnel organization, etc. (in those days the computer management of libraries was still in its infancy). When Bonner tried to explain, for instance, about the contents and organization of medieval manuscripts to graduate students in computer science in a local university who had been suggested as possible candidates, he received discouragingly blank looks. And in the meantime, of course, the program had become more complicated, with more relations between its various sets and subsets. This meant that a professional programmer was faced with the unpleasant choice of either rebuilding from scratch the amateurishly constructed, but by now quite complicated program, or taking the structure as it stood, in however wobbly a fashion, and trying to make it run as a solid, smooth, easy-to-use product.

Lola Badia and Albert Soler spent a good deal of time and energy trying to find a solution in Barcelona. One firm that specialized in programming offered to redo the DB, but, as it turned out, at a price completely out of our reach. Several years went by in which it began to look more and more as if the database would die a nameless death. Finally a solution was found much closer to the home of their academic institution: the director of the Library of the University of Barcelona, Dolors Lamarca (afterwards director of the Biblioteca de Catalunya, and now retired) came up with a person who was a computer programmer, a philologist, and a professional librarian, Miquel Hernández. Here, finally, was someone to whom we had no need to explain what was involved in a manuscript or edition, and who quickly developed a remarkable ability to understand what a Llull scholar might want, and in what form to display it. Among other things, he decided it would be more practical to correct and adapt the existing program rather than to rebuild it from scratch.

Then came the problem of the medium in which to present the DB. We had originally thought of a CD-ROM, but were persuaded that an open-access internet program would be more useful. Miquel Hernández therefore put the program into the web language of ASP (Active Server Pages), and finally, after some four years since we had started looking for a solution, a first version was up and running at the beginning of 2002. For a time it was only open to consultation, but by August of that year it was organized so that people properly authorized with a password could begin to enter or modify data. And this, of course, showed a crucial advantage over a CD-ROM: now the information offered could continually be updated and corrected.

This new version also permitted a formal addition that enormously facilitated the use of the database: this was the addition of links between its different parts. For instance, with the original version, if upon looking at a manuscript you were surprised to find a certain work present in such an early testimony, and wanted to look at that work to see how unusual this might be, you had to back out of the page you were in and then out of the section on manuscripts, enter the section on works and (having memorized its correct name or catalogue number) look up the one you wanted. One must also remember that this was before the days of the mouse, so each move around the database involved typing a letter in a little window and hitting ENTER. Instead of this laborious process, now, on the page with the information about the manuscript, you can simply click on the title of work you want to consult and be transported directly there with the list of manuscripts in which it appears.

Not only were internal links set up, but it became possible to set up links to other websites, for instance with images of manuscripts (most of which are thanks to the Raimundus-Lullus-Institut of Freiburg, and especially Viola Tenge-Wolf who has been responsible for the digitizing of manuscripts there) or of early printed editions (many of them thanks to the Biblioteca Virtual del Patrimoni Bibliogràfic, which has put the extraordinary collection of the Biblioteca Pública of Palma on the web). In the first case this means that with only a few clicks one can now check on the reading of a particular passage in several of the oldest manuscripts. In the second case this means that one can consult something previously as hard to find as the eighteenth-century Mainz edition sitting calmly in front of the computer on one's desk.

Another improvement in the web version of the program has been a search engine that can look for words—or even a portion of one word—in the title, invocation, incipit, explicit, or colophon of a work. This has proved of the greatest help in identifying pseudo-Lullian works men-

tioned in manuscript catalogues or in early library inventories, where variations in the title of a single work, or similarities between those of various works, can cause serious difficulties.

Finally it should be mentioned that an English interface was established for the program. This applies to the general indications for navigation, and to the headings of individual pages of works, manuscripts, etc. The main body of specific information has, however, remained in Catalan, since translating the more than ten thousand records contained in the program would have involved far too long a task.

Since its appearance on the web, the *Llull DB* has been constantly brought up to date and revised to improve its contents. The Centre de Documentació Ramon Llull at the Universitat de Barcelona has been supported by staff and means contributed by the Càtedra Ramon Llull of the Universitat de les Illes Balears, the Raimundus-Lullus-Institut in Freiburg, the Università degli Studi in Siena, SISMEL in Florence, and the Patronat Ramon Llull, the institution responsible for the critical edition of Llull's Catalan works.

At the same time, the *Llull DB* has been expanded on four fronts. The first significant addition has been Pereira's catalogue of pseudo-Lullian alchemical works, along with important data from the author's unpublished notes. Second, thanks to notes provided by Fernando Domínguez, of the Raimundus-Lullus-Institut, many non-alchemical pseudo-Lullian works have also been catalogued. As of now, we have registered already more than 360 of these, although there is much more work to be done in this area. Third, we have catalogued the works produced by Lullists before 1800 and have identified and classified the manuscripts and editions that have transmitted them. So far 720 of these works have entered the database. And fourth, we have elaborated a bio-bibliographical census of all names related to Ramon Llull and the history of Lullism: authors, followers and detractors, collaborators, copyists, owners of manuscripts, editors, etc. So far more than 1700 names have been registered. For the completion of the last two projects we have counted in the past few years with the collaboration of Maria Toldrà.

Furthermore, thanks to the exponential increase in the digitization of bibliographical sources of all sorts, the *Llull DB* features now links to more than 2000 digital objects, such as articles in academic journals, early and modern editions, and manuscripts—of these, the Raimundus-Lullus-Institut has digitized more than 600.[2]

Thanks to the large volume of information it contains and the technical benefits it offers (multiple internal and external links, search en-

gines, rigorous and continual updating, among others) the *Llull DB* is an exceptional tool in the realm of online bibliographies of major authors, whether Catalan or international. Problems like the one mentioned above regarding the gathering of information on a single work, which could well require one year's work, can now be solved in a few minutes.

The initial idea for the *Llull DB* was to create a tool to quickly and efficiently gather information; it was intended as a resource that would improve the functions offered by traditional bibliographical tools. Its present achievements, however, go far beyond its original objectives. *Llull DB* obviously facilitates consultation, but at the same time its integration and cross-indexing of large volumes of information serves as a stimulus for further research, particularly when it establishes unsuspected connections among the data it contains. For example, a certain manuscript could be identified as an item included in a post-mortem inventory as soon as all of the items contained in this inventory were introduced into the program. And the exhaustive listing of names appearing in the manuscript descriptions, coupled with the crossing of these names with the more than 1700 appearing in the inventory of Lullists has allowed an increased and more exact knowledge of certain copyists and owners of manuscripts who, until now, were just isolated names or vaguely identified individuals.

A new field in the database is currently being developed within the DB's Works section concerning the languages in which Llull's writings were composed and circulated. In every page of Bonner's catalogue, information is being supplied regarding the language of the work and its medieval translations, including the original language of every translated text as well as any available information regarding lost versions. It will also be possible to access the information already stored in the *Llull DB* about the languages of the manuscripts or printed editions. Users will be able to list all manuscripts and editions by language, recall information on early versions of a work by language as well (be it Latin, Catalan, or Arabic) and by "translation itinerary" (listing, for example, which works were translated from Catalan into Occitan, which ones from Occitan into French, etc.). These development have been possible thanks to the decisive collaboration of Elena Pistolesi from the Università degli Studi of Modena, on the basis of her previous research (Pistolesi, "Tradizione e traduzione").

As a complement to the *Llull DB*, the Centre de Documentació Ramon Llull of the Universitat de Barcelona is also developing the *Diccionari de Textos Catalans Antics* (*DTCA*). This lexicographical tool

is the result of the digitization of a significant group of Catalan texts of the Middle Ages and the Renaissance. The *DTCA* allows searches in the entire corpus of works or a particular subset. Concordances locating the contexts in which lemmata appear are also available. Of the twenty-one works presently searchable, seven are by Llull. Of these seven, Guillem Pagès, one of the first collaborators of Ramon Llull, copied three. Interested users will therefore be able to gain precise information on graphical, lexical, and morphological usage in these works. The *DTCA* is of invaluable help for the editor or the student of texts in medieval Catalan.

Freely available in Catalan and (partially) in English, the *Llull DB* is an indispensable tool for Lullian studies as the most recent traffic figures show: since February 2002, more than 300,000 work sessions have been initiated, leading to visits to more than five million pages, with an average of about 4000 sessions per month. Not bad for such a specialized website!

Derivatives of the *Llull DB*: the *Narpan DB*

The *Narpan DB*, <http: //db.narpan.net>,[3] is an internal user interface modeled on the *Llull DB* to service five different research groups in their management of five databases open to public consultation: the *Cançoners DB*, the *Translat DB*, the *Sciència.cat DB*, the *Eiximenis DB*, and the *Arnau DB*.[4] While access to all five databases is unrestricted, only participant scholars may access *Narpan DB*. Moreover, the *Narpan: Espai de Literatura i Cultura Medieval* website, <http://www.narpan. net>, gathers and updates general information on the activities of the research team at the Universitat de Barcelona, the Universitat Autònoma de Barcelona, and the Universitat de Girona who are involved in the *Narpan DB*. The *Narpan* website, available online since 2002, also provides links to the open databases it manages, as well as access to material available through the Biblioteca Digital, which includes a section containing articles by contributing researchers of the groups involved in the project and another one with electronic editions of texts, <http:// www.narpan.net/bibliotecadigital/biblio-digital.html>.

The *Narpan DB* also provides access to the research of still another group of scholars from the Universitat de Barcelona, the Universitat Autònoma de Barcelona, the Universitat de Girona, and several other collaborating institutions that have participated in its design and funding. This research team maintains the website *Sciència.cat*: *La ciència en la cultura catalana de l'Edat Mitjana i el Renaixement* <http://www.

sciencia.cat/>. Designed and directed since 2006 by Lluís Cifuentes, this public website offers information on the vernacular dissemination of medieval and Renaissance science and technology, including current academic news, bibliographies, and links of specific interest, a digital library, and a database (*Sciència.cat DB*). The *Sciència.cat Digital Library* <http://www.sciencia.cat/biblioteca/biblioteca.htm> features a variety of sections linking to digital versions of articles and editions of scientific works, including one page for electronic publications and another one aimed at making research available to general readers. The digital library of *Sciència.cat* also provides access to a synthesis of the catalogue of medieval and Renaissance scientific works in Catalan prepared by Lluís Cifuentes and partially published in print format, which was the starting point for *Sciència.cat DB* <http://tinyurl.com/q3e748k>. It has been available online since June 2012.[5]

As mentioned above, the *Narpan DB* is an interface that provides access to the *Cançoners DB*, the *Translat DB*, the *Sciència.cat DB*, the *Eiximenis DB*, and the *Arnau DB*. This master interface enables users to cross-reference information from nine individual databases. Entries for each of the individual databases offer information on Bibliography, People, Places, Works, Subjects, Manuscripts, Printed Editions, Documents, and Vocabulary. For the *Narpan DB*, five sections (Places, Subjects, Printed Editions, Documents, and Vocabulary) have been added to three of the five sections of the *Llull DB* (Works, Manuscripts, Bibliography, Catalogues, Lullists). The *Narpan DB* omits the Catalogues section (which is only relevant for Lullian research) as well as that of Lullists (which lists all the people prior to 1800 related to Lullian bibliography). This master database has also become a control system or thesaurus for all the names appearing in the materials inventoried through all the different fields in the databases. Not all of the databases linked to the *Narpan DB* use all of the fields mentioned above, but they do work together and the format of the resulting database is homogeneous. While the design of the *Llull DB* had the aim of satisfying the needs of a database on the work of a single author with a particularly large related corpus that is, furthermore, highly dispersed in space and time, the basic data fields for the *Narpan DB* have been designed according to each section's administrator's requirements so as to fulfill very diverse needs.

Although the *Narpan DB* is admittedly a spinoff from the *Llull DB*, it didn't seem practical to develop a connection between the two. The first obstacle was a technical concern: the *Llull DB* works with ASP+MSAccess, while the *Narpan DB* uses PHP+MySQL. The second

issue is the fact that Lullian studies have been developing their own tradition and specific profile because of the interdisciplinary nature of Ramon Llull's intellectual program, which includes works relevant for fields such as philosophy, theology, mission theory, history, philology, literary history, and history of science. The *Narpan DB*, on the other hand, deals with literary, didactic, and scientific culture in Catalonia prior to the sixteenth century. This is why the *Llull DB* and the *Narpan DB* are in fact two parallel, independent systems, and shared information—such as bibliographical updates, for instance—has to be entered separately in each system. This is the only dysfunction observed so far, which affects the compilation of the annual bibliographical bulletins of medieval Catalan literature and culture prepared by the groups involved in the *Narpan DB*, published in the *Boletín Bibliográfico de la Asociación Hispánica de Literatura Medieval* (since 1986), in *Qüern: Butlletí bibliogràfic de literatura i llengua catalanes de l'edat mitjana i l'edat moderna* (since 1993), and in the *Year's Work in Modern Language Studies* (since 1994, *YWMLS*). The bibliographical listings exported to these annual bulletins are managed from the *Llull DB*, but using an internal link to the bibliographical database of the *Narpan DB*, so that the information from both systems can be made to converge. It is, however, not possible to recover changes entered directly into the exportable lists, because the *Llull DB* began to be developed online in 2002, before the *Narpan DB* was set up. Using the same internal link procedure, the *Narpan DB* bibliographical database supplies the Occitan bibliography on medieval topics for the *YWMLS*. Since 2003, the bibliographical listings of medieval Occitan literature are available for reference on the Narpan website.

    The Bibliography and Manuscripts sections are shared by all of the *Narpan DB* databases, but not all of them use the same templates. The basic data fields for the Bibliography section are identical for all participating databases and are usually relevant and filled-out by all of the *Narpan DB* participant scholars. The Manuscript section, however, offers the possibility of storing information differently for each of the databases. The *Cançoners DB*, for instance, needs to specify the components of extensive compilations of short literary pieces, while the *Eiximenis DB*, the *Sciència.cat DB*, and (in its very early stages) the *Arnau DB* normally works with longer textual units. Depending on the destination of the data input fields, contributors fill them out completely or enter only basic codicological data and information related to their contents. A manual on how to use the database, the *Narpan DB: Guia general. Versió 1* (January 2012), is available to users on the intranet.[6]

The user's guide for the *Narpan DB* was produced by the researchers Lluís Cifuentes from the Universitat de Barcelona and Sadurní Martí from the Universitat de Girona, while the construction and maintenance of the databases has been carried out by the same programmer who designed the *Llull DB*, Miquel Hernández from the Universitat de Barcelona, who followed the researchers' indications. All this shows that the *Llull DB* has turned out to be an extraordinarily flexible model, one consisting basically of creating interconnections, designed according to specific requirements, among several different individual databases. During the first five years of operation, between 2006 and 2011, the *Narpan DB* was only a working tool for internal use. The Bibliography, Manuscripts, and Works pages were designed while materials were gathered to be entered subsequently into the system. As mentioned earlier, *Sciència.cat DB* is based on a catalogue of Catalan works, manuscripts, early editions, and other documents on scientific or technological subjects, which was developed before the database was created, and had in part appeared in a book by Lluís Cifuentes. The *Sciència.cat DB* was made available for public reference in June 2012, six years after the website was launched, and its contents continue to be expanded.

The *Translat DB* was set up as part of the project on a census of translations of medieval Catalan works on spirituality, philosophy, history, and literature (see Ferrer and Cabré's article in this volume; and Pujol). This census, the first of its kind ever to have been completed, required long, specialized research by a team of scholars, and was edited by Lluís Cabré and Montserrat Ferrer. A PDF file of the census on which the *Translat DB* is to be based can be downloaded in full. Available since 2011, it continues to be updated and improved under Josep Pujol's supervision during the 2012–2014 period.

Each of the databases linked to the *Narpan DB* poses a completely different set of challenges. For example, establishing a census of Catalan chansonniers does not require any special research, since all the codices have been well known since the beginning of the twentieth century. The difficulty, in this case, lies in the graphic and codicological study of the compilations, and the description of their numerous lyric and narrative pieces. Completing an entry for a single *cançoner* is the result of a long process of examining the materials. Digitizing the available data opens up new possibilities for research if the programmed structure has been planned.[7]

The *Sciència.cat DB* offers a reference catalogue of scientific and technical works either originally written in or translated into Catalan.

Studies on the vernacularization of knowledge in the later Middle Ages have experienced considerable development since the 1990s. The Catalan case has received attention as a complex phenomenon involving a myriad of names beyond the two that have drawn the most attention: Ramon Llull and Arnau de Vilanova.[8] *Sciència.cat DB* complements the *Llull DB* and the in-progress *Arnau DB* in presenting unedited works by mostly unknown authors, along with translations of texts on other subjects appearing in the *Translat DB*. The overall *Narpan DB* project, together with the development of the five resulting public databases, is still under construction. A cross-reference search engine is planned for a future stage. When developed, everyone will be able to recover information from all the interlinked databases from a single search mask and that will allow for complex queries.

The architecture of the *Eiximenis DB* and the *Arnau DB* presents more similarities with the *Llull DB* than any other database in the Narpan group, given the fact that all three systemize information on the work of a single author. Francesc Eiximenis (ca. 1330–1409) wrote monumental works in Catalan on theological, devotional, moral, political, and military subjects. For twenty years now, the Institut de Llengua i Cultura Catalanes (ILCC) of the University of Girona has maintained a line of research on Francesc Eiximenis which has produced critical editions published in the *Obres de Francesc Eiximenis* series as well as several studies.[9] The *Eiximenis DB* provides access to the working materials of the ILCC and other groups working on the 219 medieval manuscripts containing Eiximenis's works in four languages (Catalan, Latin, Spanish, and French). The most noteworthy contribution of the *Eiximenis DB* will be the online database version of the recently compiled catalogue of Eiximenis manuscripts, which completes and hones the information currently available from an early twentieth-century catalogue, occasionally corrected in view of recent research (Puig i Oliver, et al.). The catalogue will be rounded out with a general inventory of early printed editions of Eiximenis. The *Narpan DB*'s Bibliography, People, Works, Printed Editions, Themes, and Vocabulary database fields will thus improve the network of internal cross-references in the near future.

The *Arnau DB* is the last of the *Llull DB*'s spinoffs. Arnau de Vilanova (ca. 1240–1311) was a theologian, a spiritual activist, and one of the most outstanding physicians of his time. The number of extant manuscripts and the complexity of the attribution problems of his works, together with a sinister legend that presented him as a necromancer, require an IT tool capable of providing access to basic information now only in part available in the critical editions of the Arnaldi de

Villanova Opera Medica Omnia (AVOMO) and Arnaldi de Villanova Opera Theologica Omnia (AVOThO) series. In 2011 a research group was formed at the Universitat Autònoma de Barcelona, under the direction of Sebastià Giralt and in coordination with the *Sciència.cat* group from the Universitat de Barcelona, which began to design the database. The database will contain entries for works both written by Arnau and attributed to him, manuscripts and printed editions transmitting this corpus, documents concerning the author and his writings, and bibliography of people linked to him as a doctor of medicine or as a theologian. The *Arnau DB* will also be complemented with a multilingual website that will update and disseminate information on the author, freed from the legends which continue to cloud his image today. The Catalan version is already available at <http://grupsderecerca.uab.cat/arnau/>.

Notes

1. Most of these breakdowns were caused by problems of indexation in dBASE and Clipper, or rather of reindexation when new elements were added. This was something those two programs did not always do as automatically as they claimed, with the result that the DB, when asked to look for something with an out-of-date index, would simply crash, forcing it to be reindexed manually.

2. The complete list can be seen by clicking on "Digitalized texts" at the bottom of any page of the Llull DB.

3. The name "Narpan" is not an acronym but a character in Ramon Llull's *Romanç d'Evast e Blaquerna*. Llull's original text about Narpan is available at <http://www.narpan.net/home/quiesnarpan.html>.

4. The funding sources that have made possible the projects described in this essay include currently active grants from the Spanish government's Ministerio de Economía y Competitividad (MECO, whose previous acronym was MICINN), and from the Catalan government's Departament d'Innovació, Universitats i Empresa (DIUE). MICINN/MECO has funded three consecutive research projects, which, for administrative purposes go by the acronym CODITECAM (Corpus Digital de Textos Catalans Medievals). The identification codes for the CODITECAM projects are: HUM2005-07480-C03/FILO; FFI2008-05556-C03/FILO; and FFI2011-27844-C03. These projects' activities span from 2006 to 2014 in the Universitat Autònoma de Barcelona, the Centre de Documentació Ramon Llull at the Universitat de Barcelona, and the Institut de Llengua i Cultura Catalanes at the Universitat de Girona. MICINN/MECO has also provided funds for Sciència.cat as well as for the new *Arnau DB* database (projects FFI2008-02163/FISO and FFI2011-29117-C02, active from 2009 to 2014; whose concurrent DIUE project IDs are: SGR2005-00346 and SGR2009-1261, active from 2005 to 2013).

5. This catalogue is supplemented by an inventory of the sources (manuscripts, early printed editions and documents) that have transmitted or provided information about those texts. The part concerning the works has been published in a book offering a synthesis of the question, Cifuentes *La ciència en català*. For the origins of this line of research, see also Cifuentes, "Textes scientifiques."

6. The Narpan DB databases include links to other online resources concerning Catalan manuscripts: special mention should be made of frequent references to *BITECA*, the Catalan section of the *PhiloBiblon* website, the general database of Iberian manuscripts based at the University of California at Berkeley, launched in the 1980s. *BITECA*, published in CD-ROM until 1999, is managed by the Departament de Filologia Romànica of the Universitat de Barcelona.

7. For more details, see Martí's article in this special issue.

8. See Cifuentes, "Vernacularization"; "La volgarizzazione"; and *La ciència en català*.

9. See *Studia bibliographica*; and Riera i Torró.

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