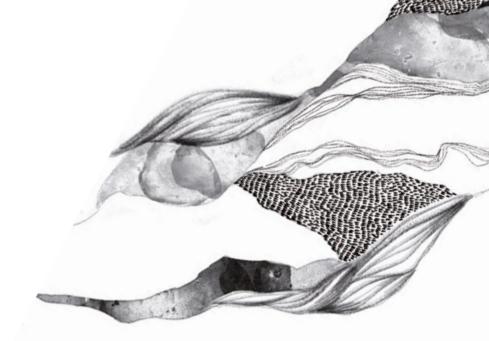


RESEARCH AT THE BIBLIOTHÈQUE NATIONALE DE FRANCE









« Beyond hosting researchers in our reading rooms, the BnF is making a significant contribution to the research efforts which are key to understanding our culture and our times. »

Laurence Engel,

Chair of the Bibliothèque nationale de France

« I have been assisted in my research countless times by the librarians at the BnF where, for more than forty years, I have found meaningful scientific partners. »

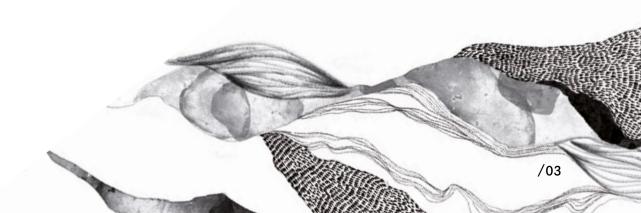
Antoine Compagnon,

Professor at the Collège de France, Chair of the Bibliothèque nationale de France's Scientific Board

« I firmly believe that research, far from being an obstacle to the professional effectiveness of librarians, is the guarantee of carefully thought-out preservation, communication meeting readers' expectations and an effective showcasing of the collections. My hope, therefore, is that librarians will see their efforts acknowledged and encouraged, as I am convinced that this is how the value of the work that scientific staff do will become apparent and that this will help them to prepare for the challenges of the future.»

Emmanuel Le Roy Ladurie,

Administrator-General of the Bibliothèque Nationale from 1987 to 1994





RESEARCH AT THE BIBLIOTHÈQUE NATIONALE DE FRANCE

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RESEARCH: A MISSION, A TRADITION

Through the many forms it has taken – as the library of the king, of the Nation, as an imperial library – the Bibliothèque nationale de France (BnF) as we know it today is steeped in a time-honoured scholarly history set against a backdrop that extends well beyond simply the reading rooms. Within its collections departments and preservation areas, knowledge has been forged, developed and taught from the outset, as evidenced in the history of archaeology, numismatics and study of Oriental languages for example.

Open to all subjects and the universal spectrum of knowledge, research does not represent merely a secondary activity, but is a core mission of the BnF, as recalled in the Decree of 3 January 1994 establishing the BnF, which "leads research programmes in connection with the heritage in its care, particularly in the field of library science". What this means is that the research it conducts is first and foremost grounded in the collections: aimed at furthering knowledge on them and interpreting them, by endeavouring to make them accessible and understandable to the widest possible audience. This central importance of the collections, their organisation and history chimes with the concerns of contemporary research, not least the humanities and social sciences, which are more than ever attentive to the material dimension of sources, to the way in which they are preserved and passed on, and mindful of giving thought in this way to their own history.

Drawing researchers' attention to collections which are lesser known – if at all – is a prerequisite for knowledge to progress in many areas. Part of this scientific and analytical activity is harnessed for the benefit of national and international research, but another aspect to it produces new knowledge of its own. The scientific work conducted by the BnF is not limited solely to identifying, counting and describing documents, but also entails asking a question or setting down a problem in a bid to address it in keeping with stringent protocols. In this way, the depth of description required for some collections sometimes leads to identification work, which adopts a fully-fledged research methodology, with a view to coming up with hypotheses and confirming them through conclusions.

That is why, between the scientific staff at the BnF and the researchers who use its collections, ties are constantly being forged between specialists, through which a common scientific culture takes shape – over and above sometimes very different skills and career paths. It is the dialogue between these two protagonists that gives rise to discoveries and lays the groundwork for each to make progress.

Research at the BnF is one part of a much broader scientific and analytical activity, ranging from the consideration of export authorisation requests regarding cultural property to the development of innovative tools for analysing and viewing digital heritage. Ongoing efforts to develop, describe and make the collections available - through Gallica, the digital library, in particular - are renewing subjects, steering issues and concerns and informing interpretations. Drawing researchers' attention to collections which are lesser known - if at all - is a prerequisite for knowledge to progress in many areas.

And yet, research at the BnF retains unique defining characteristics. Its specific contributions are:

- attention to the history of documents in all their components: their materiality, their transmission, their transformations and their preservation over the centuries right up to their digitisation;
- keen awareness of the universal value of the collections in safekeeping, and of the specific responsibility incumbent upon the BnF as regards the preservation, dissemination and promotion of the very rich collections it holds that come from outside national territory;
- continuous improvement and structuring (linked data) of the data describing these documents as well as the development of research tools (catalogues raisonnés, inventories, etc.) by studying the collections;

• consideration of the uses made by researchers in the context of its public service mission, but also because the BnF is, both in its reading rooms and online, a unique setting for observing contemporary scholarly practices.

The fact that the BnF is a library actively involved in research, in its efforts to understand the world by making sense of its past, is the sign of excellence and an intellectual responsibility regarding the future. Underpinning this activity are main research areas, an organisation and places for disseminating its findings, all of which are described in this document.

RESEARCH FIGURES AT A GLANCE

200 staff members involved in research projects, including 50 researchers who publish at regular intervals

science and technology lab with a team of 3 biologists and 3 chemists

> three-yearly and four-yearly plans since 1994, 150 multiannual projects

40 research projects led by the departments themselves

200 associate researchers hosted since 2003 [including 70 on scholarships] and 60 documentary research officers

> scientific cooperation framework agreements (since 1978) with the Collège

> > States a

[with the CNRS (since 1978), with the Collège de France (2019), the Ecole nationale des chartes and the Faculty of Arts and Humanities at Sorbonne University] **2** Joint Research Units (UMR) under joint supervision [Institute of Research in Musicology, Loire Linguistics Laboratory]

Partnerships with

4 Clusters of Excellence (Labex)

3 Facilities of Excellence (Equipex)

2 Graduate Schools of Research (EUR)

On average **10** scientific publications a year produced by the BnF, an online BnF collection on the social sciences platform OpenEdition, one BnF HAL open archive platform

14 websites resulting from research programmes [Mandragore, Presse locale ancienne, Reliures, BP16 – bibliography of Parisian publications from the 16th century, etc.].

directory of specialists and experts [personal pages and bibliographic references]

THE MAIN RESEARCH AREAS AT THE BnF

2.1. TWO ESSENTIAL STRANDS ACROSS KNOWLEDGE AND DISCIPLINES

Research activities bear primarily on two areas: the history and analysis of the BnF's collections on the one hand, and library and heritage science on the other. From an epistemological point of view, these two areas are inextricably linked.

Between them, these fields of enquiry leverage a wide range of sciences, some of which have traditionally found, at the BnF, a major national springboard for emergence and application. Of these, the sciences that were once referred to as "auxiliary" sciences of history have gained new prominence in contemporary research, which is attentive to the materiality of documents and methodical organisation of sources.

The history and analysis of the BnF's collections

- the collections studied from the point of view of their production and dissemination
- the collections studied through their intellectual content

Library and heritage science

- > preservation
- > structuring and dissemination of data
- > history of libraries
- » scholarly and academic practices

call on the following academic disciplines:

- > bibliology
- codicology, palaeography, numismatics, diplomatics
- » iconology, history of art, musicology
- data science and artificial intelligence

- biology and chemistry
- Ibrary science
-) archival science
- sociology and ethnology

2.1.1. The history and analysis of the BnF's collections

This research area can be split into two commonly overlapping fields:

> THE COLLECTIONS STUDIED FROM THE POINT OF VIEW OF THEIR PRODUCTION AND DISSEMINATION: it is under this category that scientific work involving the referencing of specialist collections comes, which regularly responds to research questions (attribution, dating) undertaking broader historical analyses. A particularly instrumental theme of this area of enquiry is the history of books in all their components (history of the illustration of printed and handwritten books, of binding, of typography and publication, of origins and of the transmission of texts).

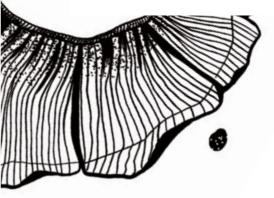
EXAMPLES

"Directory of printers-booksellers from the 16th-18th centuries": the 5th edition, covering the period 1470-1830, came out in late 2019. A key tool for identifying French and foreign printers/booksellers and dating old editions featuring in heritage collections worldwide, this directory is a national (support base for the University Documentation System/SUDOC) and international reference (incorporated in the Consortium of European Research Libraries Thesaurus);

"Coin hoards": this series of publications describes and analyses the various coin deposits discovered in France. The BnF has been developing an activity studying and referencing these hoards for four decades (28 volumes published, a database in the progress of being compiled) - even if a significant proportion does not belong to its collections. Of interest to political, military and economic history, this work places the BnF at the head of a major national research network.

> THE COLLECTIONS STUDIED THROUGH THEIR INTELLECTUAL CONTENT: the research

work on the collections increases knowledge about the civilisation to which they bear witness, its customs, institutions or portrayals. In this case, the hermeneutic and speculative dimension is essential.



EXAMPLES

"The future of online digitized heritage: the example of the First World

War'' (2013-2016): led by the Cluster (Labex) "Pasts in the Present", together with the prestigious engineering school Télécom ParisTech and La Contemporaine library-museum, this project enabled a quantitative and qualitative analysis of an online community of amateur historians of World War I, in conjunction with a network of sites whose mapping was made possible by digital legal deposit. It sheds light on developments in amateur practices and the relationship with heritage in the digital age;

"Popular education and the question of empowerment": the collections bearing on education and teaching in all its forms (educational treatises school textbooks, bulletins and periodicals, etc.) from the 16th century through to today set the stage for an array of research projects, workshops and symposia in partnership with the Archives nationales, **Cooperation Fund for Youth** and Popular Education (Fonjep), Archives Preservation Centre of Youth and Popular **Education Associations** (PAJEP), French Institute of Education and the National Museum of Education.

In addition to the main established disciplines (humanities and social sciences, natural sciences, etc.), both of these fields draw on more specific sciences:

- > BIBLIOLOGY: study and production of tools concerning the history of books in all their aspects, their production, distribution and preservation processes, identification and listing of professionals involved (binders, printers/booksellers, typographers, publishers, collectors and so on);
- > CODICOLOGY, PALAEOGRAPHY, NUMISMA-TICS, DIPLOMATICS: study of types of media other than printed books (manuscripts, maps and plans, coins, etc.) in material and intellectual terms;
- > ICONOLOGY, HISTORY OF ART, MUSICOLOGY: study of images through the works in the BnF's collections (illuminations, prints, photographs, posters, drawings, etc.); in addition to musicology for the study of sheet music and music scores;
- > DATA SCIENCE AND ARTIFICIAL INTELLI-GENCE: development of tools for structuring digital documents; content indexing and automated text mining in large corpora (OCR-processed texts, images, videos).

2.1.2. Library and heritage science

The history and analysis of the BnF's collections would not be possible without a series of studies that both support and determine them. Their scope is extensive and specific at the same time, encompassing as it does everything that enables the document to reach the researcher and be analysed: its acquisition, preservation and classification as well as the ways in which it is used at a given period of time. Such research bears particularly on the circuit followed and the form taken by the information recorded in a library, and in this way, quite legitimately, library science is not unlike the more recent "information sciences". Four main fields have thus become areas of expertise at the BnF:

PRESERVATION: this concerns traditional documents (manuscripts, printed items, etc.), which benefit from a dedicated science and technology lab for their analysis, and in equal measure audiovisual and digital documents. The BnF's expertise bears on bindings and preservation materials, restoration, disinfection and physico-chemical analyses; it also concerns digitisation processes and the sustainable archiving of digital data. Also included in this area are the constitution, processing and use of corpora with unique structuring criteria (oral corpora, web, etc.).

EXAMPLE

Analysis of pigments and colours of inks and watermarks of chiaroscuro prints, (2016-2017): led by the Heritage Sciences Foundation (FSP), together with the The Centre for Research and Restoration of the Museums of France (C2RMF), this project focused on colour engravings made in Germany, France and the Netherlands between 1508 and 1640. Characterisation of these pigments is crucial for a clearer insight into the physical nature of works and the know-how of engravers' studios back in the day.

> STRUCTURING AND DISSEMINATION OF

DATA: a national library like the BnF cannot simply make its data available to all within the common space that is the Web today; it must also make such data easy to locate, explore, interpret and reuse by humans and robots (search engines) alike, by linking the datasets semantically between each other and with other datasets for the purposes of mutually enhancing both. More broadly, any knowledge-related activity requires the preparation of frameworks and standards for which the BnF's expertise is called on time and again.

EXAMPLE

Reuse of data for music according to purpose,

(2014-2017): funded by the French National Research Agency (ANR), this project facilitates online searches on musical works: how can we find what we are looking for when "Bagatelle No.25 in A Minor" is also known as "Für Elise" or "WoO 59"? Of interest to librarians, publishers, distributors and enthusiasts of music, this project develops shared terminologies and frameworks that will enable online description of musical events and works, in keeping with the main catalogues already in existence (BnF, Cité de la musique, Radio France).

> HISTORY OF LIBRARIES: research in this area focuses on the BnF from its origins, supported by a history committee set up in March 1999. It covers the history of the collections, library processing (classification, catalogues, etc.), its architecture and sites, organisation and administration, staff and relationship with its supervisory bodies and the authorities. It readily makes use of comparative studies and comprehensive contextual studies on the library as an institution and does not overlook the question of social and popular perceptions.

EXAMPLE

Europeana Regia

(2010-2012): led by the BnF with the collaboration of four other major libraries and the support of the European Commission, this programme has digitised more than 1,000 rare and precious manuscripts from the Middle Ages and the Renaissance. All come from three prominent royal collections which have since dispersed and attest to European cultural activity at three distinct periods in history: the Bibliotheca Carolina (8th and 9th centuries), the Library of Charles V and family (14th century) and the Library of the Aragonese Kings of Naples (15th and 16th centuries).

> SCHOLARLY AND ACADEMIC PRACTICES:

the BnF is, both in its reading rooms and online, a unique setting for observing contemporary scholarly practices (searching for information, reading, annotation, etc.) as well as the relationship with books and, more broadly, documentary heritage (portrayals and uses).

EXAMPLE

A quantitative analysis of digital library user behaviours based on access logs, (2016-2017): as part of a partnership with Télécom ParisTech, with the support of TeraLab (artificial intelligence and big data platform), a brand new analysis of access logs to Gallica's servers has been

performed, applying machine learning methods. A researcher on a postdoctoral contract has developed a classification algorithm for grouping together Gallica sessions that present similarities in the sequence of actions.

All four of these fields more particularly leverage the following sciences:

- > BIOLOGY AND CHEMISTRY: research on new preservation processes and formats (paper, digital, microforms, etc.) as well as their containers, i.e. archiving boxes, folders, etc. The subject of digital archiving, for its part, requires expertise in IT, legal, organisational, strategic and heritage terms;
- > LIBRARY SCIENCE: structuring of information concerning documents (creation of standardised terminologies and ontologies), supervision and development of interoperable data formats in the context of web portals which bring together collections from different sources, use of standardised exchange protocols on the web (semantic web);
- > ARCHIVAL SCIENCE: sorting, selecting and organising documents with a view to compiling corpora and writing history;
- > SOCIOLOGY AND ETHNOLOGY: studying knowledge acquisition, reading and information practices, uses of digitised or born-digital heritage, study of the behaviour in a library.

2.2. APPLIED RESEARCH AND RESEARCH & DEVELOPMENT

Alongside the traditional and scholarly forms of research, dedicated to the description and interpretation of the collections, two other forms have developed at the BnF.

First, applied research in terms of the physical preservation of heritage collections thanks to the BnF's science and technology lab, set up in 1996, where three biologists and three chemists work today. The lab has scaled up its investment in research in recent years, through programmes backed by the Ministry of Culture, the Heritage Science Foundation and the Field of Major Interest (DIM) "Heritage and ancient materials", thus creating a national reputation which is now soundly established.

The merits of research and development (R&D) cannot be gauged solely by its direct benefits in terms of technical development.

Second, research aimed at testing out new technologies and ideas alongside existing concepts as well as exploring uncharted territory. Taking place at an earlier stage than the usual proofs of concept and even innovative ideas ready to be applied, the merits of research and development (R&D) cannot be gauged solely by its direct benefits in terms of technical development. R&D also has quite significant virtuous effects that may come later or be more subtle: it can enable upskilling in a new research field, anticipation of a technological change and a different approach to a problem. These merits were perceived very early on by the Metadata and Preservation Departments involved in European projects such as TELplus (2007-2009), as well as, more recently, Impact (2008-2011) or Europeana Newspapers (2012-2015), which have helped their practices to evolve. Metadata, catalogues, Gallica the digital library and digital preservation are thus the main areas to be directly concerned by R&D at the BnF.

Now embedded in some sectors of the BnF – not least the Information Systems Department – as a mindset and working method, R&D is expected to become fully part and parcel of the BnF's scientific missions and, in this regard, to benefit from identified resources and an organisational framework. It concerns emerging or fast-changing technical areas, such as innovative methods for accessing data, artificial intelligence or the analysis of materials for preservation purposes. A road map on R&D, which is currently being drawn up, will define the fields in which the direct or indirect effects of such research and trials will be incorporated into the BnF's tools, and in what timelines.

2.3. NEW AREAS OF OVERLAP BETWEEN COLLECTIONS AND RESEARCH

This organisation into main areas, fields and sciences is today woven through, and sometimes profoundly changed, by digital technology– whether on account of the digital transformation of collections (digitisation), the entry of born-digital collections (since 2002, with the first Web harvesting trial of online Frenchlanguage content) or new analytical and mining techniques.

Digital technology is not only bringing about new research focuses but also paving the way to new methods of processing traditional collections at a new scale and with unprecedented accuracy.

Digital technology is not only bringing about new research focuses but also paving the way to new methods of processing traditional collections at a new scale and with unprecedented accuracy. Research benefits from, and can be based on, digital technology, which is also examining and challenging our relationship to knowledge and heritage. Whilst participating fully in the digital transition of the sciences, humanities in particular, and already providing dedicated services to researchers interested in the analysis of big data, via its Data Lab, the BnF intends to develop a reflective approach on the developments affecting heritage brought about by digital technology: the types of assimilation and transmission, and sometimes of transformation or overshadowing to which it gives rise. The BnF is particularly mindful of continuing to set central store by the materiality of knowledge in the digital age, by paying attention in the projects it leads to the physical dimension of the documents studied and to the irreplaceable knowledge made possible by experiencing their physical nature.

As such, it keeps up to date with new subjects of interest that emerge in connection with its collections, considered in all their dimensions. The list below provides just a few examples from within a very wide-ranging set of research fields, the appearance and renewal of which have always shaped the life of collections (entry of new types of heritage object, referencing of unknown or composite collections and so on). These subjects take their place alongside the traditional areas of excellence (see 2.1.)

2.3.1. Research that sheds new light on the collections

> THE TRANSCULTURAL TRANSMISSION

OF KNOWLEDGE: this work is unlocking a new history of libraries, no longer written solely from an economic and sociological point of view, but from that of cultural transmission and contact with cultures.

China and, to a lesser extent, other countries of the Far-East provide exceptionally fertile grounds for such research. At the turn of the 20th century, the Manuscripts Department thus saw its Oriental collections grow to an unprecedented level, with the entry of 6,000 manuscripts in Chinese, Tibetan, Tocharian B, Sanskrit, Uyghur, Sogdian and Khotanese. Beyond the transmission of the texts, the changes in preservation site, the successive owners of the manuscripts themselves and the changing uses made of them are being studied extensively today.

> CARTOGRAPHY IN THE HUMANITIES AND

SOCIAL SCIENCES: this recent research field measures the extent of the significant development in data visualisation (including mapping) that the humanities and social sciences have gone through over the 20th century.

The BnF would like to develop research in partnership on the collections of contemporary geographers which are partly or fully in its safekeeping: accordingly, for example, the archives of geographer Jean Gottmann (1915-1994) or of cartographer and graphic semiologist Jacques Bertin (1918-2010). The graphics laboratory founded by Jacques Bertin at the School of Advanced Studies in the Social Sciences (EHESS) in 1954 was a pioneer in discussions on the link between production of images, visualisation of data and scientific research.

> THE HISTORY OF VIDEO, BETWEEN ART

AND POLITICS: from the moment it became "light", more than forty years ago now, video technology has been co-opted by all manner of spheres: the social and political, expressive and artistic spheres initially (1960-1990); vernacular uses of digital video today in the context of the great contemporary conflicts (filming and sharing practices for the purposes of reporting or documenting).

The focus of several research seminars and projects since 2012, the history of video poses both an interpretative and heritage challenge (issues of archiving and restoring works created in video).

>SOUND STUDIES: these multidisciplinary studies, which have also developed recently in France, delve into the actual functioning of sound within a society, from its production to the way it is heard, with particular attention being paid to devices and technologies.

Many of the BnF's collections could be of benefit to this field, in such diverse areas as the history of recording (the interview campaign that the BnF is conducting with recording producers is a major source of oral history in light of the few archives in this field), that of recording studios or playing and recording devices (the Charles Cros collection brings together more than 1,400 of these devices, from the first phonograph marketed by Edison in 1878 to the most

recent video game consoles). The subject of music recordings is closely associated with that of mainstream music (jazz, variety, soundtracks, etc.), which for some years now has been subject to remarkable acquisitions with potential for new lines of enquiry (arrangers' autograph scores, singers' notebooks, etc.).



>ARTIFICIAL INTELLIGENCE: in light of the increasing volumes of data it collects, the BnF is now at a point when it must call on new tools and skills. With a view to preserving, describing and enabling the study of massive, heterogeneous datasets, it draws on not only information sciences but also techniques resulting from computer science and linguistics, gathered under the umbrella term "artificial intelligence".

a contribution to the physical evaluation of collections (construction of predictive models), quality control of digitisation chains (OCR correction) and enhancement of document metadata and data (mining, form recognition, etc.). In addition to these internal requirements are the opportunities opened up by the digital collections for scientific research, which has already culminated from myriad collaborations (including with Télécom ParisTech, EPFL in Lausanne and the National Institute for Research in Digital Science and Technology/Inria, etc.). The digital documents in the BnF's collections (books, periodicals, websites, etc.) represent several petabytes of data; more and more researchers are looking to harness these volumes by applying text and data mining methods to entire corpora of documents. Thanks to these methods, a

Artificial intelligence can make

document can be studied in series with others, quantitative data can be extracted from it and automated recognition of its components is possible, etc. To cater to this new requirement, a collective study lasting three years (Corpus project, 2016-2019) imagined what a future service to provide digital corpora might look like. This involved three departments in particular: Legal Deposit, Preservation and Metadata, and the User Guidance and Bibliographic Search Department which is now responsible for its future: the "BnF Data Lab", a laboratory dedicated to data mining and support for researchers in this area, on the François-Mitterrand site.

Other contemporary avenues of research can be mentioned that are taking new approaches to the collections: **uses of the past and of remembrance**, "heritagisation", analysis of the media, art and digital technology, theatre and orality, game studies, biographic and prosopographical research, etc.

2.3.2. Collections of interest to research

>THE PRESS: for example, 1) the press in Yiddish from the 1880^s to the late 1960^s: owing to its origins, this represents an important chapter in national history and a considerable wealth of information, both as regards the memory of the communities concerned and the history of European Jews; 2) the alternative French press (musical, feminist, LGBTO, ecological, etc.): at the end of the 1960s, the mainstream press in France aligned itself more closely with power and politics, its uniformity and conformism. In the wake of the British free press, or Californian underground press, an alternative press began to develop in France, proclaiming its independence, participation in the counterculture, its irreverence and local, home-grown nature; 3) the Far-Right press: the many short-lived press publications with Far-Right leanings during the interwar period bring to light the radical movements of this time and their local specificities (support for Italian fascism, anti-Semitism, nationalism, royalism).



- >ARCHITECTURAL DRAWINGS: the BnF has a remarkable collection of architectural drawings in its safekeeping, dating from the early 16th century to the mid-20th century, from Jacques Androuet du Cerceau to Frantz and Francis Jourdain. As tools for designing and picturing building plans, they are key sources for the history of architecture. As exercises of architecture students, they are a source for the history of education of this discipline. As presentation material for the public or commissioning parties, they also demonstrate developments over time in the art of drawing. Substantial collections have already been identified, restored and digitised, such as the papers of the De Cotte agency and the drawings by Henri Labrouste in Italy, but there are other collections that are still relatively unknown and await description.
- > YOUTH LITERATURE: in the genres of children's books, tales and comics, the BnF harbours altogether outstanding collections of international scope. The arrival on its site of La Joie par les livres, now known as the National Centre for Youth Literature (CNLJ), in 2008, has increased the attention paid to these collections and the emergence of research which is featuring ever more prominently at university level. As a heritage institution, the BnF has a role to play in the legitimisation process of these objects of study. The research it is encouraging bears on text and image, their interconnection, and how these works are received.
- > EPHEMERA: this collection, of "compendia" as it is called, comprises nearly two million documents which were not initially intended to serve a purpose or interest beyond the circumstances of their production. It is made up of entirely original documentary series which are capturing historians' renewed interest in the ordinary aspects of everyday lives, in

the most fragile and least spectacular traces of events and in documents which, if it were not for their heritage status, would have been destined to be forgotten because of their form or contents: political leaflets, posters, exhibitions, sales and trade fair catalogues, programmes, tourist leaflets, almanacs, technical manuals, workshop rules of procedure and so on. These publications are also of interest to art historians and legal experts.

- > THE WEB: whether considered as a type of media, a publication space or a means of communication, the Web is in constant flux. The information it contains is therefore fragile and fleeting: contents change and websites disappear, which can be problematic for researchers in more ways than one. Archiving the French content on the Web under legal deposit by the BnF provides a stable documentary object, within which annotated, reusable corpora can be singled out, allowing researchers to test the results of previous analyses. Ground-breaking studies on online content bearing on immigration, World War I and elections, using the Web archives, have thus updated the analytical methods and hypotheses on the life of the Web in France.
- DIGITAL DATA: the BnF's digital collections, which take up around six petabytes of space today, are wide-ranging: digital documents, born-digital documents (such as video artworks) as well as, above all, bibliographic metadata (records) and authority data describing individuals, places, organisations and concepts. Such data is both structured and linked, with tremendous scope for automated processing that can benefit all areas of knowledge, from the history of publishing to linguistics and biology.

Other examples of collections of interest to research today include: **the scientific collections** (Linnaean collection, scientifica from the former Jesuit library, collections of MD theses, etc.), **royal deeds and factums (briefs)**, **autograph scores**, **unique corpora of editions** ("under implied licence" from the 18th century, of the English Gothic novel 1764-1830, etc.), **games** (board games, video games), etc.



BRESEARCH AT THE BnF: ORGANISATION

3.1. THE TASTE FOR RESEARCH

To allow the library to accomplish its missions, the BnF's scientific staff are tasked with the description, preservation, development and promotion of collections and qualified to answer the enquiries of external researchers in these areas. Many of them have both a degree from a higher education institution (university or graduate school, especially the École nationale des chartes) and a professional qualification (National School for Information Science and Libraries/ENSSIB primarily, as well as the National Heritage Institute/INP). To enable external researchers to quickly identify relevant contacts, thereby fostering scientific exchanges around collections, the BnF has compiled a Directory of Specialists and Experts which highlights the value of this individual-based approach, showcasing their experiences, skills and scientific production on each personal page.

Collective research, teaching or promotion projects that play a part in raising the institution's standing

Over and above the specific tasks it entrusts to its scientific staff, the BnF is fully committed to furthering their scientific career path where they have acquired or would like to acquire peer-acknowledged expertise in fields coming under the BnF's remit. The acquisition of academic qualifications (a PhD in particular), affiliation - as an associate member for example - with a public scientific institution, a research network or unit and participation in scientific events or publications are thus encouraged by various schemes, discussed on a case-by-case basis with senior management, subject to compliance with the routine tasks and life of the unit or department in question (training leave, organisation of working time, etc.). The aim of such encouragement is to inspire a virtuous circle: collective research, teaching or promotion projects that play a part in raising the institution's standing (such as national and international research programmes, scientific publications, exhibitions and training programmes) are often grounded in the renowned scientific expertise of its staff. Moreover, such acclaimed expertise helps to cement the BnF's reputation as

a trusted research partner in its own right, rather than just as a provider of collections.

Because the scientific skills developed by staff usually form part of a long-term career, they often exceed the main duties with which the BnF entrusts them, such as responsibility over a collection. The Collections Departments are quite rightly aware of the opportunity this represents in a context where they cannot alone cover the full range of knowledge for which the scale of their respective collections call - not least when it comes to rare language skills. Accordingly, the BnF encourages inter-department skills exchanges as long as these are based on a balanced agreement between the departments concerned, mutual information-sharing on a regular basis and a transparent attitude on the part of staff as regards third parties calling on the BnF. The blog, "L'Antiquité à la BnF", which has come about through a collaboration between three collections departments, shows just how worthwhile such a cross-cutting approach can be: it promotes the breadth and depth of the BnF's collections in a particular field among a group of researchers, bringing scientific congruities to the fore beyond organisational structure.

Some of the staff with a scientific activity as part of their duties also conduct research as a separate activity: not only for the sake of research itself, but also of producing findings in this area. Acknowledged by their peers, many of these researchers are international specialists in their field, such as the historian François Avril, who was awarded the French National Centre for Scientific Research (CNRS) silver medal in 1989, or the numismatist Michel Amandry, who chaired the International Numismatic Commission (now Council) from 2003 to 2009. Scientific staff who also conduct regular or occasional research in this manner account for nearly 200 members of the BnF's workforce, and can represent up to half the team working in some specialist collection departments. Their activity is bolstered by regularly hosting BnF-associate researchers and documentary research officers in the departments - between 25 and 30 a year (see 3.2.2.), as well as researchers under research agreements with partners or the four-yearly research plan (see 3.2.1. and 3.2.3.).

In practice, it may be difficult to distinguish a research activity at the request of the institution – so written as part of the job description where applicable – from one that a staff



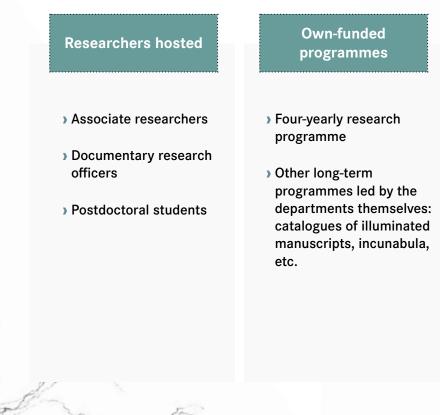
member has personally initiated: between the two, there are subtle differences to be taken on board. Research is not an activity that can be easily separated from the day-

It is first and foremost a personal activity, where tastes, willingness and freedom have a decisive role to play within a history that very often predates arrival at the BnF.

to-day tasks helping it thrive and which it informs in return (writing a record, determining an origin, answering a scholarly question from a reader, etc.), and even less so isolated in time. It is first and foremost a personal activity, where tastes, willingness and freedom have a decisive role to play within a history that very often predates arrival at the BnF. When the BnF grants assistance – irrespective of the form this may take - to a staff member for leading a research activity, after assessing its direct or indirect interest for the institution, it seeks to provide a framework and spaces for exchange and evaluation: this activity is subject to discussions during unit or department meetings, addressed during annual staff appraisals and may be presented in specific ways; researcher involvement in partnerships is, lastly, subject to approval from senior management. Furthermore, any staff member who participates in a publication or symposium as part of his or her duties or benefits in that regard from special support granted by the BnF must indicate his or her institutional affiliation.

With a view to clarifying the rights and obligations of staff conducting a research activity and the support granted by the institution in that regard (in particular: assessment of the time devoted to research, methods for recognising and endorsing institutional or personal research activities), a research project guide has been available to BnF staff since 2019 and is updated at regular intervals.

3.2. A JOINT VENTURE



Externally-funded programmes

- Clusters of excellence (Labex)
- Facilities of excellence (Equipex)
- Graduate schools of research (Eur)
- > National Research Agency
- > European Commission



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Long invested in joint research projects, whether internally or externally-funded, the BnF, rather than adopting a wait-and-see attitude and relying on external requests, proactively seeks to be a trusted partner in its own right of national and international research groups and organisations (Labex, Equipex, EUR, community of universities and institutions, etc.). It can often be found helping to craft scientific hypotheses and project methodologies in which it chooses to get involved or personally initiate where some are concerned. Knowledge of the history of collections, their constitution and preservation often proves paramount for their rigorous interpretation.

A public institution under the supervision of the Ministry of Culture, the BnF has, moreover, woven evaluation into all of its activities as a natural and regular practice, the condition of its proper development and the accomplishment of its missions. The BnF's involvement in research projects thus calls for careful ex ante assessment and balancing of the resources invested (especially the time which its staff devotes to them) and those requested (especially the cost of digital services: digitisation, OCR processing, provision of corpora).

The challenges that the BnF must take up include:

- being able to select the projects in which it gets involved based on the interest it perceives in this regard for the fulfilment of its national missions. Special attention is paid to four criteria: 1) the scientific quality of the proposals, 2) their contribution to knowledge and dissemination of the BnF's collections, 3) the collaborative dimension, 4) consistency with the other projects in which the BnF is already taking part;
- being able to fit the particular timeframe of the projects around the institution's normal duties, particularly when incorporation of the research findings into its information systems requires major changes, transmission to other stakeholders and departments and adaptation of production lines;
- keeping up alongside projects which have become a major form of research governance and funding – long-term research which can also be collaborative and outward-focused.

Research projects and the frameworks governing them take three main forms, described below, in addition to another major collective defining feature of research at the BnF: training.

3.2.1. The four-yearly research plan at the BnF

Launched back in 1994 with an annual budget of 200,000 \in , the initially three-yearly then four-yearly research plan supports research projects on the history and analysis of the BnF's collections as well as the diverse sciences involving books and libraries. This activity meets precise requirements in terms of scientific outcomes and compliance with a schedule. All projects conducted in the context of this plan are allocated resources (operating, investment and human) and are subject to an annual evaluation by an evaluation committee on which scientific experts from outside the BnF sit.

Since 1994, eight three-yearly or four-yearly plans have enabled nearly five hundred multiannual projects to be conducted across the BnF's various departments.

EXAMPLES

"The Ballets Russes in the BnF's collections", (2004-2006),

"Volatile organic compounds emitted by collections and packaging, effects on healthy collections" (2007-2009),

"An academic's study during the Enlightenment: maps, archives and manuscripts of the King's geographer Jean-Baptiste d'Anville, 1697-1782" (2010-2012), "Handwritten tradition and iconographic transmission: illustrated manuscripts of Kalila wa Dimna at the BnF, 2013-2015, Character fonts for coin inscriptions" (2016-2019).

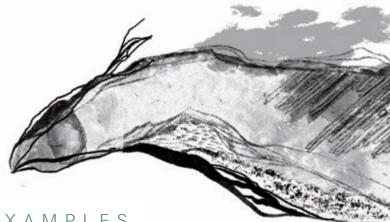
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3.2.2. BnF Call for researchers

With a view to involving young researchers (students, doctoral and postdoctoral students) in studying and promoting its collections, every year the BnF hosts researchers on an individual basis in the context of two programmes: the oldest (1978) is an opportunity to host graduates, called "documentary research officers", of the prestigious graduate schools known as Écoles normales supérieures for four years; the second (2003, added to in 2013 with the creation of the "associate researcher-musician" status) relies on a national call for researchers and provides the benefit of the BnF-associate researcher status. This status is granted for one year, following a decision by the Chair, and can be renewed twice. It comes with hosting conditions as close to the collections as possible, with the active support and collaboration of librarians and curators. In addition to this scheme is the annual award of research scholarships thanks to the generosity of patrons (Roederer scholarship for photography, Mark Pigott scholarship in the fields of history, the arts, innovation and technologies) or the institution's own funds (excellence scholarship, BnF history committee scholarship). Since 2003, more than 200 researchers have been hosted through this scheme.

EXAMPLE

An associate researcher for two years (2017-2019), **Fleur Hopkins** was awarded a BnF excellence scholarship for her final year. Thanks to her status, she was able to further her research in a littleknown literary genre as part of a PhD thesis: the **"merveilleux scientifique"**, the visual culture of which she studied. Hosted within the Science & Technology Department, she was able to explore new avenues in contact with the collections, including the lesserknown ones in the library's stacks, particularly around the question of pseudoscience or scientific imagery. This research showcased its findings through remarkable events including the exhibition inaugurated in April 2019 on the François-Mitterrand site, *Le merveilleux scientifique. Une sciencefiction à la française*, which Fleur Hopkins curated and which was well received by the media.



3.2.3. Partnerships

The BnF aspires to broaden and step up its national and international scientific partnerships. These partnerships are evaluated in terms of priority and consistency with the BnF's commitments. Careful attention is paid to the research dynamics of the Richelieu campus which the BnF shares with the National History of Art Institute (INHA) and École nationale des chartes. Following a symposium held in March 2018 on research activities in the three institutions, they have continued to develop synergies around common themes: the project dedicated to the history of the Richelieu neighbourhood (2018-2022), involving the German Center for Art History (DFK Paris) and Centre André Chastel, is one such example.

In 2019, the library signed a framework agreement for a scientific and cultural partnership with the Collège de France aimed, among other things, at strengthening the scientific collaborations and exchange of expertise between these two institutions which share an interconnected history spanning five centuries.

The other partnerships take the form of ad hoc projects or broader agreements signed with scientific organisations,

EXAMPLES

"The roots of French ethnology", (2013-2016): this project run by the Cluster Les Passés dans le Présent provides online access, in a contextualised manner, to the sources (images, objects, texts) of ethnographic missions in Sub-Saharan Africa (1928-1939), thanks to the collaboration of the Laboratory of Ethnology and Comparative Sociology (CNRS, UPN), the BnF and Musée du quai Branly-Jacques Chirac, with a perfect complementary balance between geographically dispersed collections.

"Foucault's Reading

Notes", (2017-2020): financed by the ANR (ANR-17-CE38-0001), this project explores and makes available an extensive set of reading notes by Michel Foucault in the BnF's collections. Based on the automated transcription of the handwritten notes, the project develops a digital platform for exploring the content, enhancing it with remote resources and annotations and analysing and representing its links by harnessing Semantic Web technologies.

such as the framework agreement between the BnF and the CNRS since 1978 which governs a number of specific agreements and joint ventures with research units (Institute of research in musicology, Institute of research and history of texts, Institute of modern manuscripts and texts, Loire Linguistics Laboratory, etc.). The BnF is also an active participant in several scientific groups whose research themes chime with its own priorities (see 3) and enable national and international projects to be led, usually with joint funding: Graduate schools of research (ARTEC, TransLitteræ), Clusters of excellence (Passés dans le présent, OBVIL), Facilities of excellence (BIBLISSIMA, ORTOLANG), Foundation for Cultural Heritage Sciences (FSP), etc.; it also takes part in ANRor European Commission-financed projects.

EXAMPLES

"Digitens" (2019-2022) and "NewsEye" (2018-2021) are two digital humanities projects backed by European Commission funding: one is aimed at producing the first open-access digital encyclopaedia and anthology of sociability in Europe during the Enlightenment, and the other is dedicated to developing searching and browsing tools for use by researchers to process the digitised press.

Abroad, the priority is to foster and nurture links between the BnF's collections and those of its foreign counterparts, in a bid to unite, through digitisation, heritage that has been dispersed by history or as a result of the myriad interactions between France and the world. The sites of the digital collection Shared Heritage (France-Poland, Middle-East Libraries, France-Brazil, France-China, etc.) provide access to the outstanding documents within the collections of different countries and partner institutions. Watching over the online dissemination of each collection is a scientific board bringing together the leading French and foreign specialists in the period in question. Finally, the BnF hosts, on a permanent or ad hoc basis, scientific associations on its premises: we could mention the Geography Society, French Numismatics Society, French Society of the History of Theatre or the French Musicology Society on the Richelieu site, while the Arsenal site concerns the Society of Saint-Simonian Studies, the Georges Perec Association, the Society of Romantic Studies and the Society of 17th century Studies. Such hosting is another way of working in partnership with researchers, by fostering scientific sociability. The BnF also has a special, long-standing partnership with the Society for the History of French Literature, in connection with which *the Bibliography of French literature*, 16th-21st century is published annually in a digital and hard copy version.

3.2.4. Research-led training in research

Mindful of the development of certain skills in young researchers in France (documentary research - particularly on the Web -, proficiency in ancient languages, codicology, etc.), the BnF's involvement in their training from Master's level forms part of its scientific responsibility. Such involvement helps to develop the audience using reading rooms and partnerships. It also contributes to the connection of study conducted individually in the reading rooms with more collective forms of research in which the BnF participates. Lastly, through regular dialogue with teaching staff, it enables the relevance of the collections departments' chosen scientific directions to be verified. For faculty staff have a crucial role to play in recommending research subjects to their students, and this thus helps the BnF to engage in the most contemporary concerns and to build fresh contextual approaches to its collections.

This involvement takes the form of regular contributions by the BnF's scientific staff in courses taught by higher education institutions (teaching, supervision of students' work, participation in panels of examiners for theses, etc.), and of lessons or seminars hosted at the BnF with a direct bearing on the collections: presentations of documents, workshops to study the inks and pigments of manuscripts, description of papyrus, lessons on the history of the book or engraving, etc. Such on-site training takes place on the initiative of either the teaching staff or the BnF's departments. It yields a different insight into the collections, enabling more in-depth understanding of the implications of their

For faculty staff have a crucial role to play in recommending research subjects to their students

preservation (challenge of classifications, the fact that non-digitised or non-identified collections often lie below the radar, etc.) and of the unique skills and expertise of BnF staff.

The BnF's involvement in two Graduate schools of research (Artec and Translitterae) also contributes to this trend.

3.3. SUPPORT AND EVALUATION: THE SCIENTIFIC BOARD AND RESEARCH COORDINATION

Established by the Decree of 19 December 1977, the Scientific Board is called to give its opinion on the research themes and directions. It approves the strategic objectives set out in the four-yearly research plan and its members are asked at regular intervals to sit on panels for calls for researchers and proposals of the BnF. Since the BnF seeks to have a

At the BnF, this commitment to strengthen project engineering and leadership has been a constant concern for the past decade. In 2008, the BnF entrusted the Strategy Delegation with a mission to coordinate, lead and promote the BnF's research activities. This cross-cutting mission resonates with the efforts of university and other heritage institutions in developing skills in the engineering of large-scale national and international projects, with in-house setup of research centres or departments. At the BnF, this commitment to strengthen project engineering and leadership has been a constant concern for the past decade.

Located within the Strategy Delegation & Research, the team of three people entrusted with the research coordination mission accomplishes this in practice by monitoring the myriad scientific partnerships in which the BnF takes part and by supporting the research projects involving the BnF, from their examination to their final utilisation and promotion. Such coordination also entails horizon scanning in terms of national and international research, and representing the BnF within various academic and scientific entities.

national outreach, the Board also ensures it works non-exclusively with any institution wishing to carry out scientific work on its collections. Its successive chairs, since the BnF's foundation back in 1994, have been Emmanuel Le Roy Ladurie, Georges Vigarello and Roger Chartier; it is currently chaired by Antoine Compagnon.

RESEARCH FINDINGS: DATA MANAGEMENT AND PUBLICATION

Maximising the impact of research project findings is first of all achieved through scientific events - symposia, study days and exhibitions (the catalogues of which have, in some cases, become lasting works of authority) - in which the BnF is very actively involved both on its own premises and elsewhere, always with the highest scientific standards in mind whoever the intended audience. Such high standards are the hallmark of the cultural programme: encouraging scientific debate, returning to historical sources to unlock the keys to understanding, providing reliable information within the relevant context, staying attentive to the methods by which works and methods have been distributed, disseminated and communicated down the centuries. In this way, the BnF makes a full contribution to artistic and cultural education and to information and media education. Incidentally, some exhibitions are the culmination or continuation of actual research projects: Primitives of photography, the calotype in France, 1843-1860, unveiled on the Richelieu site (2011-2012), Icons of May '68: the pictures have a history on the François-Mitterrand site (2018), Chiaroscuro engraving, Cranach, Raphael, Rubens... (2018-2019) at the Louvre (with special support from the BnF) or Mysterious boxes: Prints in the time of the Lady with Unicorn, 2019-2020 at the Musée de Cluny.



In addition, the BnF is a public publisher with a catalogue of over a thousand titles. As part of its policy to promote collections, the BnF publishes around 10 to 12 scientific works a year (inventories, catalogues raisonnés, source guides, critical works) for the attention of researchers and library professionals. These scientific works serve a public service purpose. Part of this provision can be accessed on the BnF's e-publishing website, within the OpenEdition Books platform (CLEO). This squares with the BnF's pledge to promote open science that guarantees, in accordance with the intellectual property and privacy regulations, open access to public research findings. Eager to promote the use of open archives by its scientific community, on 2 April 2013 the BnF

Over and above events, scientific publications and articles, research today is also generating results which are improving the access, description or promotion of the BnF's collections.

signed the "Partnership agreement in favour of open archives and the HAL common archiving platform", with a certain number of Directors and Heads of institutions of research organisations and universities. Since then, it has populated its platform at regular intervals within the HAL multidisciplinary open archive (HAL stands for Hyper Articles onLine).

The BnF's scientific staff ensures the relevance and regular updating of these institutional dissemination spaces, in addition to the pages devoted to research on the bnf.fr website, the BnF's online host of research blogs hypotheses.org and the directory of BnF specialists and experts, for the purposes of informing academic audiences.

Over and above events, scientific publications and articles, research today is also generating results which are improving the access, description or promotion of the BnF's collections. Since these results are now usually produced in digital format (transcription of documents or encoded records, databases, website, etc.), the question of their future is tied in with that of the necessary IT developments for their hosting, maintenance, accessibility and possible enhancement, when the nature or granularity of the data generated is too detailed

or specific for meeting the standards of its catalogues or digital library. The BnF gives precedence to incorporating research findings in one of the catalogues or an existing site of the BnF for the sake of economic and technical sustainability, as well as user-friendliness and sharing. That said, the BnF also endeavours to offer additional solutions, particularly when it is a question of making accessible, online, unique collections whose description model is too far removed from that of printed items or archives, or of carefully organising them in an annotated and curated fashion.

Alongside these specific projects, the BnF has decided, as part of its four-yearly plan 2020-2023, to examine the roll-out of a shared solution for managing databases produced by research. The aim is to end up with a single system for managing bases comprising heterogeneous data, from the data entry stage right through to its dissemination, and thus to ensure sustainable maintenance and access – rather than to develop bespoke solutions for each project.

EXAMPLES

The BnF's Bindings

database is the outcome of a project of the three-yearly research plan (2013-2015). The BnF harbours one of the world's largest collections of bindings, which for a long time remained largely inaccessible to the wider public. The main aim of the reliures.bnf. fr website is thus to provide a regularly updated selection of bindings that represent the history of this craft in France and, in the medium term, in Europe, together with a detailed description. Over and above such exposure on the Web, the aim of the website is to assist with the identification and description of bindings, by providing Internet users with tools for in-depth research into all of their characteristic features (typology, decoration, technique, structure).

The "BP16" database, which stands for Bibliography of Parisian publications from the 16th century, is also the fruit of a project of the four-yearly research plan (2016-2019). It sets out to identify printed production in Paris throughout the 16th century. Written on the basis of the manuscripts of Philippe Renouard (1862-1934) preserved in the BnF's Rare Book Reserve, it pays special attention to the resolution of the publications shared, the referencing of issues as well as the identification of typographic material.



The fact that this document has not mentioned the services for research, which are available in the reading rooms and the wide range of online tools provided by the BnF, is intentional. These services are defined and governed by various reference documents that guide the BnF in its choices: Content strategy for developing the collections, Content strategy for digitising the collections of the Bibliothèque nationale de France or the Preservation strategy. By firmly adopting the approach, not of a one-size-fits-all solution, but of a library "actively involved in research", probably less visible and almost certainly less known, this document has sought to shift the focus towards a bustling,

long-standing activity that the BnF shares not only with scholars all over the world, but also and above all with other respected national libraries. These respected institutions cultivate unique knowledge and expertise, that is true, but also a certain style of research: paying attention to the materiality of sources, their transmission, their changes over the centuries and the organisation of information enabling them to be accessed and interpreted. What humanity preserves from its past becomes apparent through a certain "order of knowledge"; it is the librarian-researcher's job to establish this, but above all to safeguard the memory of it and to review it at regular intervals.

5 APPENDICES

5.1. LIST OF CONTRIBUTORS TO THE DRAFTING OF THIS DOCUMENT

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