ATLAS HISTORIQUE DES VILLES DE FRANCE
HISTORIC ATLAS OF TOWNS OF FRANCE
codir. É. Jean-Courret, S. Lavaud
Ausonius Éditions

Specifications

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This document has been drawn up for authors and it sets out the guidelines for the realisation of a volume in the collection of the *Atlas historique des villes de France.* While it lays out norms and directions it is also meant to be a guide to creating a volume as well as indicating the steps to be followed in the conception of a historic atlas of a town for inclusion in the collection.

1. HEURISTIC AND HISTORIOGRAPHICAL POSITION

1.1. The *Atlas historique des villes de France* collection

1.1.2. An initiative by the International Commission for the History of Towns (ICHT)

The *Atlas historique des villes de France* collection comes under the auspices of the International Commission for the History of Towns. When it was founded in 1955 it set up a programme for the historic cartography of towns across Europe, and France joined this programme. The role of the ICHT which is part of the International Committee of Historical Sciences is to provide a forum for exchanges and discussions between European and international partners. Concerning the production of the atlas the ICHT has supervised the harmonisation of the collections,[1] as well as the indexing of productions.[2]

The model for a French atlas began in 1973 under Philippe Wolff, professor at the University of Toulouse, president of the ICHT at that time, and Charles Higounet, professor at the University of Bordeaux and director of the Centre de Recherches sur l'Occupation du Sol /

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[1] A first guide for the publication of an atlas of towns was proposed in 1968 during the general assembly of the ICHT in Oxford. It was brought up to date in 1990 ; see the ICHT site : http://www.historiaurbium.org

[2] Indexing initiated by Ferdinand Opll (University of Vienna, Austria) : http://www.wien.gv.at/kultur/archiv/kooperationen/lbi/staedteatlas/bibliographie/index.htlm

Centre for research into the occupation of land and also of the associated laboratory of historic cartography. These two founders benefited from the experience of the English (1969) and German (1972) atlases which had laid the foundations of the enterprise. They drew up the framework according to national specificities, especially as regards the Napoleonic origins of the land registry. In 1982 the first French atlases were published under the supervision of Jean-Bernard Marquette, professor at the University of Bordeaux. The 48 fascicles produced under his supervision (1982-2007) provided a dense coverage of certain regions such as Aquitaine, Midi-Pyrénées and Brittany as well as Lorraine and Franche-Comté. The CNRS took care of the first publications and distribution then, from 1996 onwards, this fell to Editions Ausonius when the research laboratory Ausonius (UMR 5607, CNRS Université Bordeaux III) was set up since the atlas programme is attached to this laboratory.

1.1.2. From the original model to the current model

The atlases are the expression of geo-history which was dear to the hearts of the founders and they have been drawn up with a view to the occupation of land and its population, with a special place reserved for the monographic and cartographic approach to space and so they have been conceived as the product of a culture that is historico-geographical. The approach, which brings together historical geography and topography and which we might qualify as morphohistorical was innovative at that time, when the context of dynamic urban history was little inclined to analyse and represent space.

The model of the French atlas, envisaged as it was in order to reply to scientific criteria, prioritised the plan as the central document, so originally the fascicle was large-size (42 x 31 cm) in order to accommodate it, along with a few documents of comments brought together in a General Information notice.

The spirit and the general orientation of this original model of the French atlas is still the format for any new enterprise. Nevertheless the collection has had to evolve alongside historiographical and technical developments. The rise in urban archaeology, the development of new approaches (archaeological, geomorphological ...) over the past two decades have contributed to the emergence of new questions about urban fabric and the morphogenesis of towns, questions which are alert to the permanent and dialectical interaction between actors and spatial structure in the process of the formation of towns. These questions have helped to make the atlases the tools and/or the products of spatial analysis. It must be added that to this renewal in scientific approaches there have been linked advances made in computer cartography and in Geography Information Systems which have led to computing being used for the building of all the data and metadata including those used for plans.

The collection changed in 2003, adopting an easier to handle format (27.9 x 21.2 cm) and a richer General Information Notice and this evolution has accelerated with the Bordeaux programme as this is the first major French city to be included in a historic atlas. The new model that was promoted at that time is the reference for the collection today, not only for the production process but also for the scientific approach and the published product. Nevertheless, this could however be subject to legitimate modifications according to the specific characteristics of the urban object under scrutiny. In fact, incorporating an atlas in a scientific programme may cause it to evolve around the space designated for study. Thus, looking at the scale of territory, which is necessary when thinking about the town, may lead to a need to vary the scale of analysis. Moving from the self-centred town which used to preside over the joint town-region would imply upsetting the *doxa* of a cartography on the cadastral scale of 1/25000 in order to produce work which matches the different scales that are

pertinent in urban territory. This change in focus could be mobilised by a comparative approach which could make use of a confrontation between urban cases at different levels of analysis: between urban types on the regional scale and on the scale of a network. Chrono-chorematic modelling can also help to support this approach.[3] Such modifications and propositions introduced by the scientific director according to the town under study ought to be submitted for validation and for the agreement of the director of the collection and the scientific committee (see 2.1 and 2.2 on the role of these different authorities).

Since 2011 the collection has been **jointly supervised:** Ézéchiel Jean-Courret is more specifically in charge of the technical and cartographic aspects; Sandrine Lavaud looks after the institutional and editorial aspects. They are both members of the collection's **scientific committee** which includes national experts who are specialists in urban history of different periods. This committee's role is to supervise and validate the programmes of the historic atlases.

1.2. Objectives and composition of a volume

1.2.1. an overview of the formation of urban space

The first scientific aim in producing a volume in the *Atlas historique des villes de France* collection is to make a diachronic study of the forming of urban space, from its origins to the date of the cadastral plan taken as reference. With a view to making a spatial analysis it is about proposing an interpretation of the urban fabric and setting space and the buildings therein at the heart of the thinking, where the political, social and economic fields of history, while not being discounted, are only included where they impact upon that space. In fact, it is not a complete history of the town but a focus on its spatial and landscaping structures.

This approach is carried out according to recent data and scientific knowledge while still relying on older historiography. The production of an atlas must, in fact, be a synthesis of the progress made in research. Thus it becomes that much more efficient to the point that it becomes the crowning glory of a scientific dynamism that was started by the renewal of data and marked by the increase in research studies and publications. The atlas must therefore integrate this subject matter and make a summary, on the scale of the town but also on the scale of the surrounding territory.

In the way it is put together and in the ways in which it is written, the atlas must therefore satisfy the demands of researchers who might find in it new interpretations and questions about the town as much as it should provide answers for local actors: elected politicians, architects, urbanists ... as well as the general public's inquiries about heritage. With this view, we might envisage appendices or secondary publications. To reply to these scientific aims, the most convenient presentation for the historic atlas of a town seems to be that of three parts, like the model inaugurated by the Bordeaux atlas.

1.2.2. starting with the plan…

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[3] To have a better idea of the chrono-chorematic modelling, go to the site of the workshop of the / Centre national d'archéologie urbaine / national centre of urban archaeology: www.culture.gouv.fr/culture/cnau/fr as well as the review *Mappemonde* which devotes number 100 to the topic.

The first consists of the historic plan; this is the central document of the atlas starting from which all the other productions in the volume are articulated and this alone resumes the spirit and the aim of the programme: based on a reliable, older plan of urban plots, it should retranscribe and compile information relative to the structuring of urban space up until the date of the reference cadastral plan. It is considered to be both a finished product and an investigative tool, produced by GIS on the old town and intended for inclusion in it.

Like the English model the cadastral plan known as the "Napoleonic" plan, made to a scale of 1/2500[4] is the basis of the plan that will be worked on. It will be up to the scientific director to evaluate the existing documentation and to decide on the corpus for study according to the cadastral plans available, and the land registries associated with it and also of the chronological pertinence (preferably before the major urban transformations of the second half of the 20th century). According to the cases and the study frameworks that are selected, several cadastral surveys will form the basis of the reference plan. This base map has been digitised, geo-referenced and then redrawn, keeping the cadastral scale of 1/2500 (see part 3, technical specificities, particularly 3.1). Whether it comes from just one source or from a number brought together, the historic plan is always an artefact, a constructed cartographical reference where the subjective dimension must be totally assumed.

1.2.3. the scale of the town …

The information compiled about the plan is reorganised in the General Information notice, which is a comment, in written form, on the scale of the town, which will be the subject of the second part. The General Information contains a diachronic summary and brings historical facts and interpretations relative to the stages of the structuring of the urban space and as such it should be a tool that facilitates the investigation process of the reading of the plan. This should contribute to the restitution by offering a way of reading the urban fabric, organised according to historic phases. According to the thresholds in the spatial construction, this periodisation is a vital prerequisite to the writing of the General Information notice and justifies the relationship between the chapters. Each of these is accompanied by a plan that proposes a cartographical restitution of the urban space for the phase under study. Besides the summaries that they provide, these plans thus introduce a synchronic vision which complements the diachronic reading of the general plan. The addition to the written commentary of illustrations and maps which make use of ancient sources as well as modern day productions is also an integral part of the aim of the investigation and they are the complement to the plan.

1.2.4. the scale of sites and monuments

On the historic plan, all the public monuments that mark the urban space are marked in plane geometry. The graphic semiology used highlights three aspects of these monuments: the date of their construction and any renovations, their state - still in place or disappeared - at the date of the plan and the degree of their restitution (certain or uncertain) by the historian; it also gives information on the nature of the land use indicated by the associated land registries on

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[4] The cadastre is called "Napoleonic" because it became law with the Finance Act / loi de Finances of 15 September 1807, even though its actual application very often extends beyond the First Empire.

the base map. Drawn up in this way, the historic plan provides a double reading: that of the "cadastral landscape" which gives an account of the state of the town and its monuments at the time of the reference cadastre, that is during the first half of the 19th century; and that of the " restored" monumental landscape" such as it is presented by the restitution of sites and public monuments and which gives, in a diachronic vision, a cartographic transcription of the forming of the urban space and of the monuments that mark it. These are the subject of explanatory historical notices brought together in a third part entitled: Sites and Monuments. Like the General Information Notice, the function of this part is to give the keys to reading the plan, but with regard to the monuments.

The cohesion between the three parts – Historic plan, General Information and Sites and Monuments – is ensured by a system of references and an index.

2. REALISATION STRATEGIES

2.1. Scientific Direction and research team

Coordinating the set up of the historic atlas of a town is the responsibility of a scientific director. The candidacy of this person must be validated by the steering committee and the scientific committee of the collection. His or her mission is scientific as well as organisational and institutional. Whatever their speciality, the director must know the whole history of the town and master the spatial dimension over time. Their role in the realisation of the volume is to make sure that the scientific positions and the norms fixed by the collection are respected.

The director must assemble a multidisciplinary team of researchers who are specialists of the town (historians, archaeologists, geologists, geographers...). The core of this team is limited to about fifteen authors and they may be joined temporarily by other colleagues. The director oversees the coordination and this is to be done by regular meetings. S/he fixes the scientific orientations as well as the publication's own imperatives. S/he will follow the realisation of the volume from the initial scientific considerations to the publication.

The scientific director is also in charge of the institutional and financial aspects of the project. S/he is the contact person for the collection team as well as with Ausonious Editions publications. It is on his or her initiative that partnerships are set up, also agreements and the requests for the subsidies necessary to the project with the regional services for archaeology and inventory, the archives collections, libraries and territorial authorities.

If s/he is a member of a research laboratory, the scientific director will undertake institutional negotiations on behalf of the team s/he belongs to and the authority or body under which this operates, or even on behalf of the research programme to which the historic atlas is attached. Should the director not have any local connection and come from a scientific institution unconnected to the object of the study, an action agreement, limited to the realisation of the atlas, can be drawn up between him or her and the Ausonious institute so that the institute can ensure that there are institutional connections.

2.2. Relations with the collection authorities

The role of the steering committee of the *Atlas historique des villes de France* collection is to advise the scientific director and his team, as well as to supervise and to give its scientific validation. It provides technical and geomatic support for the realisation of the historic plan as well as methodological assistance when it comes to publication. It can also act as mediator in contacts between institutions.

The scientific committee has a threefold role to play alongside the scientific director at different phases of the implementation of the project:

- in the first phase, it validates the atlas project as it is presented by the scientific director;
- during the conception phase, it can provide assistance and advice on the scientific orientations of the project;
- in the final phase, it acts as a reading committee. Its approval for publication is a prerequisite before the draft is submitted to the publisher.

Ausonious Editions is in charge of publication, according to the accepted norms, as well as distribution of the volume. The scientific director may make proposals and the details will be determined by the director of publications.

Neither the collection authorities nor Ausonious Editions is responsible for financing the realisation of the atlas.

2.3. Financing the project

The project for the conception of a volume in the collection requires three main budget envelopes:
- acquiring the rights to use the sources, especially iconographic and planimetric sources, from deposits held in archives or by territorial authorities;
- acquiring data; the constitution of GIS and data bases might require temporary staff and demand technical implements;
- publishing.

There are different means which will contribute to the financing of these budget lines which the scientific director will be in a position to appreciate according to local realities. Most of this is generally accounted for by the research programme, whatever the type, to which the making of the atlas is attached as well to subsidies granted by cultural institutions (in particular the DRAC (Regional Directorate for Cultural Affairs) and territorial authorities (the town, the general council of the department, the regional council) once the files have been submitted.

2.4. Partnerships and agreements

The creation of an atlas requires the setting up of partnerships, contracted or not, according to needs. These partnerships are a contract linking the scientific director of the volume, on behalf of the unit he belongs to, and the overseeing authority (University, CNRS ...) - if need be, Ausonius , see 2.1 and the possibility of action agreements - with the institution or the participating territorial authority. Three major items can start this off:
- the exchange of sources or data, in particular the acquisition of Napoleonic cadastres, with deposit centres and their territorial authority or supervising institution;

-   the participation of researchers from other research centres or institutions (archaeological services…) in the work team;
-   finance could be the subject of an agreement with the paying body, with a possible counterpart in valorisation and the contribution of a fixed number of volumes.

The agreements, drawn up case by case, must be validated by legal experts for the different parties concerned before being signed.

3. TECHNICAL SPECIFICITIES

According to the norms laid down for the collection, a volume of a historic atlas is made up of three parts. The realisation of each of these is the subject of a specific methodology and procedures. In the time line of its creation, it is recommended that work begins by drawing up the plan before selecting the sites and monuments, which is the prelude to part 3, and then finish by drawing up the General Information Notice.

3.1. Planimetric management of the atlases

Whatever the extent of the geographical frame of the study, from a simple urban community to the grouping of several municipalities, the realisation of an atlas is a long process and the creation and validation stages take up all of the realisation process. This is the reason why digital cartography must be tackled first. Two other factors explain the rigour behind the following instructions: firstly, the plan determines the internal organisation of the piece and secondly, it is the collection of volumes edited for each urban case which constitutes the atlas. Therefore, to ensure the internal coherence of the volume and the collection, authors must pay attention and carefully follow these recommendations, while considering what it is possible to do with the sources and the material available. The joint directors of the collection are committed to suggesting solutions to resolve the multiple problems which are part of this procedure.

3.1.1. The planimetries of the atlas

When engaged in the production of a study, authors use and make different planimetries, which do not all have the same role nor the same place. The historic plan is the central part of the collection and requires the application of a norm common to all the volumes in the collection. This is made up of two types of metadata. The first make up the base map, based on the cartography of the so-called Napoleonic cadastral plan (cf. above). The second type is data produced by the authors in order to restore earlier views of a site or a monument. These two kinds of data are compiled on the same map and they form the cartographic reference for the study

Besides this reference, authors are often obliged to produce complementary plans for integration in parts of the General Information Notice and the Sites and Monuments file in order to restore a spatial phenomenon, on the town scale, of a unit of the plan or of a building (partial plans, elevations ...). Ideally, the productions should also respect the norms of the volume, not those of the collection. We might therefore hope that the plans of buildings which have an entry in the Sites and Monuments file would all be made to the same scale, using a common semiology. Often however, the considerable human resources need to carry out this work are not available and unreasonable requests cannot be made of authors. The

cartographer will take care of the validation of the cartographic productions in order to make sure that the elementary norms of cartography are respected (title, author, orientation, scale, semiology, caption).

A last kind of plan, associated with the General Information Notice nevertheless has a particular place and must be made to conform to norms: this is the question of reconstituted historic plans which punctuate the end of every chapter of the General Notice. These plans result directly from the cartographic references. The degree of restitution is left up to the discretion of the authors but it must be the same for the whole study. It allows the reader to consult a cartographic summary of the spatial entities described during the period concerned in the chapter and allows him or her to move away from the compilation vision which the cartographic reference proposes. It might be made up of an overview of Sites and Monuments and of an estimation of the urban area at a given moment, geo-referenced elements on the outline of the roads and blocks of buildings, the base map, the cadastral plan (sites, monuments, city blocks, streets ...) on the chronological threshold which closes the chapter.

The team must include an expert cartographer, whatever his or her initial training (cartographer, geographer, urbanist, architect, archaeologist, historian ..) who must be on the same footing as the authors. Their job is to produce the data and/or to validate those of the authors. Although the composition of the team may be limited in size by the local contexts we would advise the authors that the different kinds of cartographic production can be made by one single person. First and foremost this is because a plan or map is a construct and that different people might map the same spatial object in different ways and that would hinder the harmonisation of data. For example, a cadastral plan mapped by different people has diverse and contradictory topological relations which is negative for the spatial analysis of objects. Finally, in terms of efficiency and coherence in the production process one single person will more easily solve any mistakes made because s/he will tend to make the same kind of errors, whereas interventions by several team members will engender a typology of errors which are more difficult to correct.

3.1.2. The conditions for the realisation

This technical part of the specifications is entirely devoted to the cartographic reference where the norms for setting it up condition all the other productions which conform to norms (historically reconstituted plans).

▪ GIS and CAD Software

Since the 1990s, there has been considerable technological progress in digital cartography and this now provides the indispensable tools for the production of data. Planimetries that conform to norms must be done with cartographic software which, as they develop, will allow the drawing up of GIS and geo-data bases. Today there are GIS software that can be bought (ArcMap® and all its spinoffs, MapInfo®…) or that are free (Quantum GIS®, Orbisgis®…). The *Atlas historiques* collection can advise on the choice of these applications but cannot provide the licences for software that must be paid for.

Software for computer aided design (CAD), such as those produced by Adobe®, are thus no longer used to produce normative cartographic data in the collection, neither for the assembly of raster data (Photoshop®) nor for the design of vector data (Adobe Illustrator®). These CAD applications can however be used in authors' own productions.

- **Spatial referencing of data:
the Lambert RGF 93 projection**

The days are long gone when cartographic plates for atlases were produced on 5 colour cromalin, themselves replaced by CAD software, and which ran the risk of deforming the cartographic sources by assembling them manually. Geo-referencing of old cartographic data guarantees a better spatialisation of objects. The management of information associated with spatial objects via the geo-databases allows statistical and spatial analysis which the CAD software does not.

Similarly, it is a long time since geo-referenced data were produced on a large panel of cartographic Lambert projections (Lambert I, II, III and their variants) adapted in accordance with the site under study. European directive 2007/2/CE of 14 March 2007, called the Inspire directive (http://www.developpement-durable.gouv.fr/La-directive-europeenne-Inspire-de.html), which aims at establishing an infrastructure of geographical information within the European community with a view to protecting the environment, is now applied to cartographic productions in national research centres. All of the data is therefore projected in Lambert RGF 93, which in France and in Europe replaces the former cartographic projections.

- **Electronic referencing of data**

The authors are also committed to referencing their cartographic production on the platform for mutualised geographical information in Aquitaine (PIGMA; http://cartogip.fr/) with which Ausonius has drawn up an agreement. Authors retain their full intellectual property rights over the data gathered: PIGMA has, among its many objectives, the aim of identifying the current data and the old data produced over the national territory. It is therefore not a question of putting the data online - even though that is possible on PIGMA, but rather of flagging up the existence of the data where the consultation and the distribution remain dependent on the authors' authorisation.

3.1.3. The stages in the cartographic production

The realisation of the cartographic reference lasts all throughout the editorial programme. It is therefore necessary to start this going as soon as possible by firstly making the basis of the historic plan. The authors will need this plan in order to carry out properly their research on the identified sites and at the monuments and in order to produce their summary for the General Information notice. Moreover, having the basic plan early enough allows the cartographer to establish some distance with regard to what s/he produces which is a necessary condition for him or her to be able to validate, correct and perfect their work with a minimum of critical distance. Secondly, after validation of the cadastral basis, the work consists in mapping as precisely as possible the monuments which contribute to the construction of this spatial fabric. This stage is generally carried out at the same time as the Sites and Monuments and the General information notices are being drawn up. The specific technical phases of these two main stages will be detailed below.

- **The cadastral base map**

  - **Choice of the cadastral plan and acquisition of raster data**

Selecting a reliable old plan is the prerequisite for this whole enterprise. To this end, the collection is based on the use of the so-called Napoleonic cadastres (cf. above). The authors must therefore check the homogeneity of the cadastral documents used. This concerns not

only the quality of the mapping survey (many proto-cadastres simplify over-complex buildings while precisely respecting the plot of land; these should therefore be avoided) but it also is a question of the survey registry which document the nature of the ground occupation and fiscal levies.

We can therefore prefer those documents which have been well conserved and where the survey registries have been correctly handled (classified by plot or by section) rather than the other registries (classified by owners and by the more or less complex usages which have been due to many changes down the years).

The geo-referencing of the cadastral plans requires the availability of flat digital scans that are high definition (preferably 300 dpi with the initial scans in tiff format). For this, many departmental archive departments as well as the town archives in large municipalities have digitised, flat, these kinds of archives (most often only the cartographic plans have been done so one can photo the fiscal registers oneself). Similarly many archaeological services have these data, quite often because they helped to finance the costly digitisation operations. As authors have requested, the co-direction of the collection has made available to the scientific director the model for an agreement with a view to making these data freely available.

- **Geo-referencing of raster data**

Projecting raster data in a coordinate system using GIS software (image constructed from a pixel grid of variable definition according to the scale of visualisation, *i.e.* the flat scans), requires being able to use the current cartographic reference which allows the linking of similar points on the old cadastre and on the present one. To carry this out, one can use the raster data of the cartographic data base of the IGN (Institut Geographique National) or, even better, a current version of the digital cadastre.

It is only when the old and the current plans have been made available that the cartography can really begin. The precision in geo-referencing the raster data conditions the precision and the adjustment of the vector data produced (the image is made up by vectors in constant definition whatever the scale of visualisation). A geo-referencing protocol has been established in order for this stage to be properly carried out while respecting the integrity of the planimetric sources. The main points can be resumed thus:

a. Geo-referencing by creating common control points between old and current cadastres: on average, fifteen points are necessary.
b. These points must be distributed as evenly as possible across the cartographic space of the sheet.
c. Among the transformations possible, affine transformations (type 1) and Helmert (type 2) are to be preferred for they adjust the cadastres without deforming too much the shape of spatial objects (a risk with type 3 transformation).
d. The spatial error between the control points (known as RMS for Root Mean Square) is subject to a double constraint: the global error of the points must be inferior or equal 0.50 m (RMS ≤ 0,50); the error of each point (or residual) must not exceed twice the value of the Root Mean Square error (for example, for a RMS = 0.4 residuals superior to 0.8 cannot be accepted).

- **Vectorisation of data**

Redrawing each spatial object in the cadastral plans is not an easy task. The very nature of the sources deployed (precision of the lines and the lettering, washes of colour, grouping codes of

the different objects on the same plot) is extremely varied and obliges the cartographer to make choices. It is therefore a good idea to deform the sources deployed as little as possible. In order to do this a protocol for vectoring has been set up. This can be rapidly summarised as follows:

- The design of the vectors must be positioned in the middle of the breadth of the line. It must therefore vectorise on a more precise scale than that of the source in order to place the vector in the centre of the width of the line. A homogeneous vectorisation is the result of work carried out on a constant scale, wherever possible. For a drawing mapped at 1/1000, an effort is made to work between 1/250 and 1/500.
- There are 3 methods for vectorising objects. To best respect the orientations of the plots and the topology, as well as those of the other objects contiguous to the buildings, creating entities one after another does not yield the best results. Building two plots which seem to have the same alignment on one or more sides one after the other is not valid. To overcome this difficulty, the two other methods are more operational. The first one consists in firstly outlining the largest topographical units, which are the city blocks, and then dividing up the plots, taking care to respect the continuous alignments of several plots. The second method, which is more delicate when it comes to the management of data, consists in not vectorising by polygon but by polyline, once again respecting the alignments. The polygons can then be created automatically via the topology of the polylines and the nodes that they form between themselves. However, this method requires the vectorisation of polylines by type of object, otherwise the updating of the attribute tables will be difficult.
- The topology between objects must be perfect. If, for example, one wants to calculate the area of the plots automatically it is important that the objects are not superimposed and there should not be any unexpected voids either. Several GIS software programmes allow the programming of the topology rules in order to validate the work carried out.

The very large amount of data used for the cartography (orthophotographies, IGN data base, DTM, cadastres…) and the amount of data produced demands that the files be properly classified. A model directory and geodatabase structure files have been made and are available to authors upon request. The vectorised data are classified and regrouped in 10 layers:

1. municipal territory, (polygon, name)
2. section (polygon, name of the cadastral section)
3. block (polygon)
4. sector (polygon, microtoponymy) : the urban plots do not necessarily have a microtoponymy, this layer could thus be optional
5. streets (polygon and polyline, toponymy, typology)
6. hydrography (polygon and polyline, toponymy)
7. plots (polygon, nature, microtoponymy)
8. the buildings (polygon, nature, microtoponymy)
9. no buildings (polygon, nature, microtoponymy)
10. divers objects (polygons, points or polylines mapped on the sheets, but not described in the survey registry)

A final type of data remains to be built and to be integrated into the edition of the plan and these are the altimetric references. Most of the time, the old cadastres do not include this kind of data; at best the index to the sections gives a washed-out blur of the main contour lines.

However, since it serves as a reference to the study, and the General Notice and Sites and Monuments files are there to comment on it, the reference plan must contain these pieces of information. The authors must hunt for any elements likely to give up such information, where it exists, and this is not always the case. It is therefore proposed that altimetric data produced at the closest date to the selected Napoleonic cadastre be used and where pertinent, in particular for periurban areas the current DTM (Digital Terrain Modelling) might be used.

The cartography and the registering of the metadata require validation and correction procedures which it is proposed be established as follows:

a. vectorisation done per plate and not from the outset on all the plates of the cadastre
b. vectorisation by construction of polygons in the "block" layer then by division of the "plots" (starting from a copy of the polygon in the "block" layer)
c. vectorisation of the "hydrography" layer respecting the alignments of contiguous objects and respecting the topology of the "block" layer)
d. vectorisation of the units of the "built" layer respecting the alignments of contiguous objects and respecting the topology of the "plots" layer".
e. validation of the topology of each layer once the plate is finished
f. registration of the numbers of the plots on the redrawn plate (this step also means there will be no superfluous plot object)
g. carrying over the protocol for each cadastral plate
h. automatic creation of the line system of the streets and registering information associated with the streets (typology, toponymy)
i. registration of the nature of the occupation of the land and the microtoponymy (when it exists) of the plots and of the buildings based on the survey registry (this step allows the validation/correction of the numbering of the plots; it also provides a means of checking that the objects described pertain to the right plot, which is not always obvious when just observing the cadastral plate)
j. vectorisation of the "divers objects " divided up and registration of the probable nature of these objects, not described in the survey registry (the plates are fairly frequently washed with colours, the blue wash shows ditches with water, the pink shows isolated walls, dots show paths and private passages ...)
k. creation of the "non built" layer by subtracting the "built" and "divers objects" layers
l. spatial junction of the " built, non built and divers objects" layers with the "plots" layer to recover the numbers of the plots, the section, the microtoponymy and, for the "non built" layer, the kind of occupation of the ground.

When the basic plan is established all that is left to do is to apply the collection semiology which will allow us to distinguish the nature of the land occupation at the date of each cadastral plate. (cf. above: editorial norms).

- **Cartography of restituted historic data**

The second stage in drawing up the planimetric reference consists in integrating into the plan the layers relative to the historic data restituted by the authors for each site and monument. In order to do this the person responsible for the cartography must work with each member of the project in order to translate the drawing onto the plan in the best manner possible the state of the sites and their degree of restitution. Like for the basic plan, a specific caption for the historic objects has been drawn up for all of the collection (cf. infra)

The authors' attention is here drawn to the fact that the productions should give an account of the degree of restitution possible for each site. Apart from the semiological periodisation

(violet = Antiquity; red = Middle Ages; orange = modern era; green = contemporary era), the plan expresses the reliability of data in the following way:

The sites and monuments where all or some of them are documented by planimetric sources will lead to a restitution in the form of a polygon. The attribute data associated with the mapped objects must integrate the degree of reliability of the restitution in the following manner:

- - Existing : site and monument existing at the date of the plan and where the restitution is certain
- - Certain : site and monument disappeared at the date of the plan and where the restitution is certain
- - Likely: site and monument at the date of the plan and where the restitution is likely
- - Hypothetical: site and monument at the date of the plan and where the restitution is hypothetical
- • The sites and monuments which have disappeared and where the plan is unknown and the localisation is approximate are represented by free symbols (star).

This stage requires constant dialogue between the cartographer and the authors. It is proposed that this task be carried out as follows:

a. Each author responsible for the study of a site must put together a file of the sources which will then allow the mapping of the data. It is therefore a good idea to choose the plan or plans of buildings which are the most apt when considering the evolution of the site. For buildings which have known long periods of occupation it is often necessary to discriminate between information that relates to different periods of the cadastre - antiquity, mediaeval, modern or contemporary - in order to respect the graphic semiology of the atlas. The authors will therefore make sure that they will supply the best planimetric documentation, in a flat, digitized version, so that the cartographer can geo-reference the plans correctly. For buildings where the periodisation is complex, the cartographer might also request the authors to draw their restitution hypothesis on a paper copy of the base map, prepared, validated and edited as a working document for the cartographer.

b. From these files, the cartographer geo-references the documentation and redraws the hypotheses by following the steps summed up previously. S/he must also record the metadata associated with each restituted object. Although the atlas authors are not required to construct a true GIS, the researchers must nevertheless integrate the information relative to the author of the restitution, the taxonomy of the site, its periodisation and its degree of restitution.

c. At the end of this phase, the cartographer presents each author with the cartography that has been made for validation or amendment. Any modifications to be made imply a new phase of validation by the cartographer and the authors.

3.1.4. Publication of the cartographic sources

▪ **Publishing norms**

When the work of drawing up and validating the cartographic reference (base map and restituted historic data) is done, then the editorial work begins. To do this, files containing the captions for the base map and the historic data have been put together for the cartographer. These files, in particular the one associated with the base map, are not exhaustive: the codes

of semiological representation that have been drawn up concern the most common kinds of occupation of the land. The particulars of the occupation specific to each urban case will give rise to the creation of new semiotic codes within the framework of codes and chromatic scales proposed.

The reference plan produced by the GIS software must be printed in a pdf file (Adobe Acrobat Pro®) and must respect the CMYK colour code. Depending on the breadth of the study's geographical framework and also on the financing available for the publication of the work, the cartographic reference might be published as one or several plates. Small urban territories (town and immediate environment of plots of land), less than 150 ha, could be published as one plate not including text, folded and included in an expanded pocket in the book. Plans of towns which are larger can be published as several plates on an appropriate scale (1/2500 for the urban parts; 1/5000 for the peri-urban parts; 1/7500 for the rurban parts). These sheets are published in a bound format.

Finally, whether it is published as one or several plates, the plan must include a grid which will facilitate the localisation and the indexing of sites and monuments. It is therefore proposed that the grid correspond to 250 m squares to help the reader navigate between the different parts of the study via the index.

- **Documentary tradition**

In the same way that historians establish tradition for texts the commented edition of the planimetric source must also be accompanied by a documentary tradition. This proposition which is specific to the presentation of the plan allows the presentation of the documentary construction drawn up by the cartographer. It also allows the context of the mapping and the relations with the planimetric activities promulgated by the 1807 finance laws (the cadastre on 15 September and the alignment plan on 16 September) to be put into perspective

3.2. The General Notice

From the information compiled from the plan the General Notice proposes a summary on the creation of the urban space and this must be the result of joint, interdisciplinary deliberation. The team and its director must be particularly vigilant and make sure that the Notice has a unified look especially as the texts will have been written by different researchers which tends to make it more heterogeneous in scientific positions, in style and in vocabulary, which are specific to each author and to his or her discipline. But this diversity in the writing, which is the result of working as a team, can also prove to be rich in the variety of approaches as well as very revealing of the dynamics going on in historiography. Each author is required to cast his or her specialist eye on the chapter(s) that s/he is handling.

The organisation of the chapters is based on the periodisation proper to the history of the town and is decided by the work team. Each of the chronological phases selected must correspond, in the spatial structuring, to a stage which is identifiable by monumental markers and sanction a significant episode in the urban history. The recommended average time scale is from one to two centuries and the time markers must be established according to events which turning points in the history of the town. The contemporary period after the date the plan was established should not be handled in the body of the text but it can figure in the conclusion which gives the general outline of the most important spatial developments over the past two centuries but without necessarily referring back to the plan.

The author of each chapter must write his or her text bearing in mind the publication guidelines of Ausonious Editions as well as the instructions given by the scientific director (volume, themes…). He or she must submit his text to the scientific director for a critical reading and if necessary must make any modifications requested. S/he may include reference footnotes and must supply a list of the major text sources at the end of the chapter, as well as a bibliography which will be integrated into the general bibliography. S/he must also add illustrations and maps for which s/he must give the references and, where necessary, the reproduction rights.

The appendices to the General Notice include:
- A general bibliography organised by major periods and alphabetically, presented according to the publication guidelines of Ausonious Editions;
- a table of figures listed numerically by chapter;
- an index of the sites and monuments cited in the text and identified by an asterisk; the indexing is done by toponym then by the nature of the monument (between brackets); the page references precede the coordinates on the plan which are shown in bold. The monuments cited are described in notices in part 3.

3.3. Sites and monuments

The creation of part 3 devoted to sites and monuments which figure on the historic plan is a new feature of the collection – it began with the *Atlas historique de Bordeaux*, and is justified because of the keys to understanding that it provides on the scale of urban features and at the same time it allows the General Notice to remain focussed on the scale of the town. The notices about monuments which make up this part aim to draw up a summary account of knowledge about the monuments whose history they recount, of their construction up to their destruction or to their current state. These notices must therefore satisfy scientific standards while still answering the public's demand for heritage information. The creation of this part requires the research team, before they do their inventory and write their comments, to decide on both scientific and methodological hypotheses, especially concerning taxonomy as well as on their norms in the ways that they draw up the notices. The main principles were laid down for the Bordeaux atlas but can be modified on a case by case basis.

By sites and monuments, we mean selected singular and autonomous structures that are markers of the landscape. If the word "monument" generally refers to a built construction, the word "site", in the sense of a place or where a social action has taken place, allows us to extend the notion to un-built sites where human activity has been focussed and has had an impact on the urban space. Only buildings that have had a public function should be included, either ones which have some relation to the exercise of expression of public power, lay or ecclesiastical, or else ones where inhabitants have made common use of it. Any buildings in the private domain are excluded, particularly civil dwellings but also urban infrastructures developed on a bigger scale than the scale of the block (road network, hydrographic network, port structures, urbanism programmes ...) that is, any recurrent and repetitive element which should be treated more globally, and depending on themes mentioned specifically in the General Notice. Each monument is the subject of a specific notice drawn up by one or several specialised historians.

Each notice corresponds to a site, a localisation and a function. If one of these parameters has changed over time a new notice must be drawn up. However, this can be flexible, thus in the case where sites have changed functions several times and rapidly without their structure being greatly modified, a single notice relating the functional changes can be drawn up. We

can also envisage that for certain sites of the same type (necropolises, gateways, mills, hospitals and chapels ...) one summary notice can group them together. Their global treatment allows us to highlight their identity and their shared specificities. The most remarkable cases can nevertheless be the subject of special notices with a referral to the summary notice.

3.3.1. Description of a notice

The framework and the composition of a notice relative to a monument or a site have been fixed as follows:

▪ **Name of a site or a monument :** this is unique if it has always remained thus, unchanged since the date of construction up to today; in case there have been modifications, the different names are given and indexed beginning with the current ordinary name. Older names must be given in French and spelling variations not taken into account.

▪ **Author(s):** name of the author(s) of the notice.

▪ **Information form**: in the form of a table, it corresponds to a brief identifier of the site considered; it includes three headings given in bold:

▪

Typology		
Localisation	Coordinates on the plan	Address
Chronology	Construction	Abandon/destruction

▪ **The typology** specifies the function of the site; this taxonomy allows the establishment of conceptual relations between the sites in the order that serves for indexing. The terminology was drawn up by adapting the thesaurus of the Patriarche[5] data base. Five main types have been distinguished. These allow for the functional interpretation of the unit under consideration; each one of these is divided into several categories specifying the nature of the function.

- • **Political** qualifies places where public power is exercised. It has three categories:
  - a. **Seat of an institution**: building or part of a building inside which public government and administration are carried out;
  - b. **Place of justice**: building or part of a building linked to public activities for the application of justice and control and respect of the law;
  - c. **Tax office:** building or place for the administration of a public authority where taxes are levied and paid.

- • **Defensive** any element with a defensive and/or military vocation; two categories have been selected:
  - a. **walled enclosure**: permanent fortification defending a town or part of a town;

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[5] Ministère de la Culture, Direction du Patrimoine / Ministry of Culture, Heritage department

b. **military construction**: building with a military vocation, but not specifically defensive.

- **Public** this concerns public infrastructures, which although they may not always be part of a public authority and may have been privatised, have a common and collective usage. Three main categories have been established:
  a. **development**: any element dealing with developments that are hydraulic, to do with a port, to do with streets or crossings;
  a. **economic**: place of activities for production, processing, commercialisation and consumption;
  b. **spectacles - entertainments**: building designed for shows, games and entertainments.

- **Religious** distinguishes all the places with a religious vocation and has five categories :
  a. **place of worship:** building devoted to a religion; a place used for the worship of one or more divinities; for churches, only those which have a parish function will have a specific notice; those attached to a religious establishment will be dealt with alongside this;
  b. **religious establishment**: establishment where a community resides governed by religious rules;
  c. **annexe to a place of worship**: building which is associated with a place of worship, is dependent on it but is not a place of worship itself;
  d. **seat of a religious institution**: place for which ecclesiastical power is exercised;
  e. **funerary space**: space where sepulchres are found.

- **Education and assistance** relates to any monument whose function is to do with teaching or health; two categories have been selected:
  a. **teaching**: building linked to collective teaching, specialised or not, religious or lay;
  b. **health**: building where the vocation is healing and care.

This typology with its two levels for the entries must be applied to each monument or site, according to the function which has been affirmed and recognised, which is detrimental to the evident multi-functionality of some of them. This typology can be modified and amended according to the specificities of the monuments in the town under scrutiny.

- **The localisation** of the site means it can be found both on the plan of the atlas and in the present-day town. It includes:

  - The **coordinates of the site on the plan**. These are given based on the squares whose identification is given on the edge of the plates of the historic plan. The abscissa axis (letter) and the ordinate axis (number) of the square(s) where the site is located are shown first, followed by the number of the plate(s), shown in brackets. In the case of linear structures such as fortifications, only the number of the plate is given (between brackets).

- The **address** is that of the entrance to the monument when this is known. It is given according to road names in the reference cadastre; the current name is given in brackets. When this is the same as that in the cadastre this is marked "id.". The nature of the road or street is only shown in brackets if there has been a change. The current plot numbers are shown in brackets along with the street name.

- **The chronology** is given for two key moments in the life of the monument, where these are known:

  - Its **date of construction:** if there is no mention of this it is because the dating cannot be specific beyond a general period of construction which is indicated by the classification order in the notice and the corresponding colour code. This absence of a mention also goes for complex monuments which include elements created at different periods and these stages are recounted in the summary.

  - Its **abandon or its destruction**: the dating does not appear if it is unknown; this sign ⛫ means that all or part of the building still exists today.

Under these two headings the dating is absolute or approximate, even hypothetical, according to the precision of the data. These are given in figures and in a new style for certain absolute dates and in centuries for dates which are more uncertain. A question mark indicates suppositions.

All the referrals to another site or monument which also have a notice are mentioned in the identification form as well as in the summary (the first time a site is mentioned), with an asterisk that refers to the final index.

- **Synthesis:** this sums up the information known about the site; three entries which appear in the publication in the form of tabs and these should be used:

  - the **construction** of the building under study, in the light of known data, the dating, the context of its building and those involved, those who ordered its construction as well as site managers, architects and builders;

  - the **architecture** of the site gives account of its original state, later re-workings and its current state. It is the whole architectural programme which must be analysed. Only the most remarkable architectural elements should be described in detail. The site is also inscribed in its monumental environment or in the context of its creation, by underlining the correspondences with other buildings;

  - the **functions** specify the role and the use of every site as well as the different kinds of authorities who have been connected with it , on whom it has depended and for whom it has served as a central point. The nature of its occupation and its role in the structuring of the space

allows us to understand its impact and its polarising effect on the spatial organisation of the town. The ultimate fate of the building is also mentioned.

This plan with three entries can be adapted in the case of complex structures, like fortifications, or for collections of sites of the same type.

- **Bibliography :** this is specific to the site and includes the published works which make reference to it.

- **Iconography :** this has to be limited (4 illustrations maximum, properly referenced) and must be chosen by the author of the notice according to realism of the representation and their lisibility.

2.3.2.   Organisation of the part and classification of the notices

Inside the part, the notices must be ordered according to a three level classification:

- **First level**
  Chronological Order by period of construction of the monument: antiquity, mediaeval, modern or contemporary. Each period, clearly limited chronologically is identified by a specific colour in the key to the plan.

- **Second level**
  Typological Order, according to the function of the monument as it is listed under the Typology heading in the identification form the classification follows the order of the headings indicated above: 1. Political, 2. Defensive, 3. Public, 4. Religious, 5. Education and assistance and then within each of these headings, the order of the categories.

- **Third level**
  Alphabetical Order: within each functional field the monuments and sites are classed alphabetically according to their toponym (the first indicated, which is the most common) or else according to their nature.

An **index** of the monuments and sites located at the end of the volume gives the page. Indexing is first done by toponym, then by the kind of monument.

Biographical notices of the main **actors** of the urban fabric can be added as appendices to this part and can also be included in the index. These actors can be identified in the notices and in the General Notice by an asterisk.

These pieces of advice and these recommendations are the result of our experience, taking into account both the requirements of the collection and the necessary adaptation to the urban case under study. They are in no way absolutely fixed and can be amended at any time by any of those who take part in the construction of this collection.

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Atlas historique des villes de France Collection

Volumes published, 1982-2009 (chronological list by region) :

Gironde-Landes:
Bazas/Gironde (Jean-Bernard Marquette, 1982); **La Réole**/Gironde (Jacques Gardelles, 1982); **Mont-de-Marsan**/Landes (Jean-Bernard Marquette, 1982); **Saint-Sever**/Landes (Jean-Claude Lasserre, 1982); **Bordeaux**/Gironde (Sandrine Lavaud, Ézéchiel Jean-Courret, 2009)

Pyrénées-Gascogne:
Auch/Gers (Gilbert Loubès, 1982); **Bayonne**/Pyrénées Atlantiques (Pierre Hourmat, 1982); **Foix**/Ariège (Gabriel-Michel de Llobet, 1982); **Pau**/Pyrénées Atlantiques (Christian Desplat et Pierre Tucoo-Chala, 1982); **Tarbes**/Hautes-Pyrénées (Maurice Berthe, Roland Coquerel et Jean-François Soulet, 1982); **Oloron-Sainte-Marie**/Pyrénées Atlantiques (Jacques Dumonteil, 2003); **Orthez**/Pyrénées Atlantiques (Benoît Cursente, 2007)

Périgord-Limousin :
Bergerac/Dordogne (Yan Laborie, 1984); **Brive**/Corrèze (Bernadette Barrière, 1984); **Périgueux**/Dordogne (Arlette Higounet-Nadal, 1984); **Ussel**/Corrèze (Jean-Loup et Nicole Lemaitre, 1984); **Limoges**/Haute-Vienne (Bernadette Barrière, 1984)

Quercy-Rouergue :
Albi/Tarn (Jean-Louis Biget, 1983); **Cahors**/Lot (Jean Lartigaut, 1983) **Figeac**/Lot (Jean Lartigaut, 1983); **Montauban**/ Tarn-et-Garonne (Jean-François Fau et Jean-Claude Fau, 1983); **Rodez**/Aveyron (Bernadette Suau, 1983)

Agenais :
Agen/Lot-et-Garonne (Jacques Clémens, 1985); **Marmande**/Lot-et-Garonne (Jacques Clémens, 1985); **Nérac**/Lot-et-Garonne (Jacques Clémens, 1985); **Villeneuve-sur-Lot**/Lot-et-Garonne (Jacques Clémens, 1985)

Bretagne :
Fougères/Ille-etVilaine (Jean-Pierre Leguay et Claude Nières, 1986); **Morlaix**/Finistère (Jean Tanguy, 1986); **Saint-Malo**/Ille-et-Vilaine (Catherine Laurent, 1986); **Vannes**/Morbihan (Patrick André, Jean-Pierre Leguay et Claude Nières, 1986); **Lorient**/Morbihan (Claude Nières, 1988); **Quimper**/Finistère (Jean Kerhervé, 1988); **Brest**/Finistère (Marie-Thérèse Cloitre, 1991); **Saint-Brieuc**/Côtes-d'Armor (Jean Kerhervé, 1991)

Île-de-France Picardy :
Étampes/Essone (Claudine Billot, 1989); **Senlis**/Oise (Ghislain Brunel, Thierry Crépin-Leblond et Jean-Marc Femolant, 1989); **Provins**/Seine-et-Marne (Pierre Garrigou-Grandchamp et Jean Mesqui, 1992); **Mantes-La-Jolie**/ Yvelines (Lucien Bresson, 2000)

Lorraine - Franche-Comté :
Belfort/Territoire de Belfort (Michel Rilliot et Yves Pagnot, 1993); **Épinal**/Vosges (Bemard Houot, 1993); **Montbéliard**/Doubs (André Bouvard, Jean-Claude Voisin, 1994); **Nancy**/Meurthe-et-Moselle (Jean-Luc Fray, 1997); **Bar-Le-Duc**/Meuse (Jean-Paul Streiff-Figueres, 1998); **Toul**/ Meurthe-et-Moselle (Michel Hachet, Abel Lieger, André Mertzweiller, 2000)

Roussillon :
Collioure-Port-Vendres/Pyrénées-Orientales (Antoine de Roux et Alain Ayats, 1997);
Perpignan/Pyrénées-Orientales (Antoine de Roux, 1997)

Normandy :
Alençon/Orne (Gérard Louise, 1994); **Évreux**/Eure (Pierre Bauduin, 1997)

Poitou-Charente :
Niort/Deux-Sèvres (Valérie Trouvé, 1998)

Chronological list of the 49 volumes

1982
Auch
Bayonne
Bazas
Foix
La Réole
Mont-de-Marsan
Pau
Saint-Sever
Tarbes

1983
Albi
Cahors
Figeac
Montauban
Rodez

1984
Bergerac
Périgueux
Brive
Ussel
Limoges

1985
Agen
Marmande
Nérac
Villeneuve-sur-Lot

1986
Fougères
Morlaix
Saint-Malo
Vannes

1988
Lorient
Quimper

1989
Étampes
Senlis

1991
Brest
Saint-Brieuc

1992
Provins

1993
Belfort
Épinal

1994
Alençon
Montbéliard

1997
Collioure-Port-Vendres
Évreux
Nancy
Perpignan

1998
Bar-le-Duc
Niort

2000
Mantes-la-Jolie
Toul

2003
Oloron-Sainte-Marie

2007
Orthez

2009
Bordeaux