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CONTENTS PAGES

BEYOND THE THEME

PROJECT

REVIEWS 337

Tours: origins of urban archaeology, new approaches and new questions

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Focusing on urban archaeology practices in Tours, this article first describes how the discipline has developed in France since the end of the 1960s, showing the progressive professionalization and the replacement of local structures by national bodies. Secondly, it describes the computer tools that have been developed to move on from topographical or morphological analysis to modelling. Finally, the article explores two main on-going issues concerning chronology and urban form in Tours, namely the nature of protohistorical occupation, and how the urban landscape changed during late Antiquity and the early Middle Ages.
Keywords: urban archaeology, topography, morphology, modelling, *longue durée*

Centré sur la pratique de l'archéologie urbaine à Tours, cet article met d'abord en lumière les grandes étapes de la discipline en France depuis la fin des années soixante en montrant la professionnalisation progressive et le remplacement des structures locales par des organismes nationaux. Dans un deuxième temps, sont présentés les outils informatiques développés pour passer de l'analyse topographique ou morphologique à la modélisation. Enfin, sont abordées les deux principales questions qui restent ouvertes en matière de chronologie et de forme urbaine à Tours à savoir la nature de l'occupation protohistorique et les transformations du paysage urbain pendant l'Antiquité tardive et le haut Moyen Âge.
Mots-clefs: *archéologie urbaine, topographie, morphologie, modélisation, longue durée*

1. Introduction

Urban archaeology has been established in Tours for more than fifty years and is one of the core strengths of research there, with strong links between the University and the CNRS and rescue archaeology organisations. This volume of *Post-Classical Archaeology* gives us the opportunity to describe first the main intellectual and institutional mile-

stones in the development of urban archaeology in Tours, with constant switching between local and national levels, and then the successive approaches to the town, from topography to modelling, and the tools required for each approach. Finally, we examine the main on-going questions regarding occupation during late Antiquity and the early Middle Ages.

2. Fifty years of urban archaeology in Tours

2.1. From Winchester to Tours: the beginning of urban archaeology in France

It is well known that British archaeology played an important role in the emergence of urban archaeology in the 1960s, based on the pioneering work in Winchester led by Martin Biddle. A large number of European archaeologists worked on the excavation site of the ancient capital of Wessex, which rivalled London at the end of the early Middle Ages and could have laid a claim to be the capital of England unified by the Wessex dynasty.

Henri Galinié was one of those European archaeologists who trained at the Winchester school, and he imported the model to France, undertaking the development of a comparable research programme in Tours, beginning in 1969. Using recording techniques that spread gradually across France, from Tours, Saint-Denis and Douai, the project was based above all on an approach that went beyond the excavation of emblematic sites, such as the residence of the Counts of Anjou or the area around the collegiate church of Saint Martin, but sought to understand the town as a whole. In other words, the aim was to develop an archaeology of the town, and not archaeology in the town. This challenge is as relevant today as it was then (CNRA 2016).

The intellectual link between Winchester and Tours can be seen notably in the specific interest in the medieval town, even though the programmes in both countries were essentially interested in the *longue durée*. When the two programmes were launched, at the beginning and end of the 1960s respectively, medieval archaeology had not yet been recognised on the continent; while the journal *Medieval Archaeology* was first published in 1957, it was not until 1971 that its French counterpart, *Archéologie médiévale*, appeared. Nevertheless, despite an earlier interest in England for the medieval period, and apart from the traditional excavations of burial grounds carried out since the 19th century, it was the village, and in particular the numerous deserted settlements identified by aerial photography, that first drew the attention of archaeologists. The decision to

study a town such as Winchester, due to its prestigious medieval past and the availability of abundant and high quality written sources, was an unusual undertaking that spread rapidly across the whole of the United Kingdom. In France, where the first stirrings of medieval archaeology were limited to the study of 10th-12th century fortified sites and villages that had been deserted at the end of the Middle Ages, the development of an urban archaeology programme focusing largely on the Middle Ages and which even included the modern period, was equally innovative.

2.2. Soil archives

In 1979, ten years after the start of field work, the links between Tours and the urban archaeology carried out in Great Britain also gave rise to the publication of a book modelled on *The Future of London Past* by Martin Biddle, Daphne Hudson and Carolyn Highway, published six years earlier. Like its British model, *Archives du Sol à Tours, Survie et Avenir de l'Archéologie de la Ville*, by Henri Galinié and Bernard Randoin (who had also worked in Winchester), took stock of topographical knowledge from Antiquity to the modern period, and assessed the state of preservation of the sub-soil in order to detect the least known periods and to assess the capacity of archaeology to provide answers to the questions raised.

2.3. International symposium of urban archaeology in Tours in 1980

The development of a long-term urban archaeology programme in Tours led the Minister for Culture to hold the first European symposium on this topic there. The symposium was held in November 1980 and was preceded by preparatory work presented in a volume of preliminary reports (*Archéologie urbaine* 1980). Four working groups were formed to discuss the following issues: 1) urban archaeology, 2) the French experience (57 standardised files, together with plans, are published in this volume), 3) assessment of urban archaeological heritage, research analysis procedures and programming, 4) intervention procedures. The symposium proceedings, published in 1982, were in three sections: the preliminary reports of the working groups, the texts of the papers that were presented, and a transcription of the discussions (something that is now rarely done). Martin Biddle introduced the papers, which included case studies in France (Bordeaux, Douai, Lyon, Orléans) and other countries (London, Oxford, Lübeck and the Netherlands) and talks on methodology dealing with the use of archaeological data in urban planning, regulations, and the issue of small towns (*Archéologie urbaine* 1982).

2.4. Creation of the National Centre of Urban Archaeology

At this symposium, the Minister for Culture announced the creation of the National Centre of Urban Archaeology (CNAU) in Tours. It was set up in 1984 and was a landmark in the development of this discipline in France. The CNAU was designed both as a forum for methodological discussion and as a resource centre for the scientific community, and it organised round tables on methodological issues, published the *Annuaire des opérations de terrain en milieu urbain (Annual report of field operations in urban environments)* and the *Bulletin bibliographique d'archéologie urbaine (Bibliographic bulletin of urban archaeology)*, and between 1990 and 2012 it published 22 volumes of a collection of documents assessing the archaeological heritage of French towns (*Documents d'évaluation du patrimoine archéologique des villes de France)* modelled on the *Archives du Sol à Tours*. This research tool and resource centre, the only one of its kind in Europe and beyond, was definitively closed by the Minister for Culture in 2016, on the grounds that the issue of urban archaeology would henceforward be integrated entirely in the management and practice of archaeology conducted by the regional archaeology departments (Garmy 2016). And yet, the same year saw the publication of the *Programmation nationale de la recherche archéologique* (*National schedule of archaeological research*), which included a section entitled '*Le phénomène urbain*' outlining the current issues on the subject (CNRA 2016, pp. 121-135).

2.5. From non-profit organisations to institutions

In the 1970s and 80s, a number of non-profit organisations were created with the aim of developing urban archaeology in France. For example, in 1973, the *Laboratoire d'Archéologie Urbaine de Tours (LAUT)* was part of a non-profit organisation set up to promote the study of urban archaeological studies in Tours (*Association pour le développement des études d'archéologie urbaine à Tours, ADEAUT*). These organisations were supported by the municipalities but were based on statutes of private law, and they employed a large number of archaeologists who were generally under contract but had no job security. In the same year, the State created the *Association pour les Fouilles Archéologiques Nationales (AFAN)* in order to react more effectively to the threats posed to archaeological heritage by the construction boom. From the end of the 1980s, the Minister for Culture sought to concentrate preventive archaeology interventions in the hands of the AFAN, which resulted in many local non-profit organisations, such as the LAUT, gradually having to withdraw from field activities.
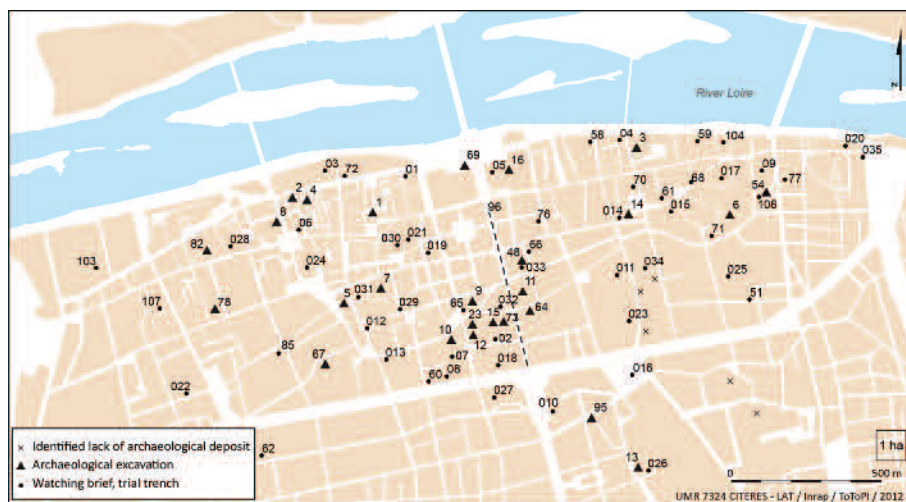
Fig. 1. Tours, archaeological watching briefs and excavations between 1969 and 2018.

Between 1969 and 1994, the LAUT carried out thirteen excavations and thirty-four watching briefs, accumulating a considerable amount of standardised archaeological documentation (fig. 1). Thereafter, the intervention of archaeologists recruited directly by the AFAN, under the authority of the regional archaeological curator, led to a new situation and a more centralised management of archaeological activity. In other towns that had municipal archaeological departments, some archaeologists continued to work in the field, while others focused on publishing previous work. In 2001, the AFAN was replaced by the *Institut National de Recherches Archéologiques Préventives* (Inrap), a public institution that currently employs 2,200 people. Opening up archaeological practice to competition in 2003 gave rise to a new wave of creation — or strengthening — of archaeological departments in municipal or *département* councils, as well as the emergence of private companies. Throughout France, this led to an increase in the number of archaeologists acting in the same area, including in towns with a municipal archaeological department, such as Chartres for example. In Tours, field activity is divided between the local headquarters of Inrap and the *Service de l'Archéologie du département d'Indre-et-Loire (SADIL)*. A partnership agreement and a good relationship between the teams mean that scientific discussions are possible, but, in principle, it is regrettable that different teams are involved in fields of research that require continuity to guarantee the memory and homogeneousness of practices. The *Laboratoire Archéologie et Territoires* (LAT), created by Tours University and the CNRS in 1992 and incorporated

within the multidisciplinary research unit CITERES in 2004, picked up LAUT's activities through a programme of research on the history of the town. Between 2000 and 2003, the LAT carried out programmed excavation in the heart of the former urban space on the site of the Prosper Mérimée square, within the precinct of the former Saint-Julien monastery. Since 2004, its work has been devoted to research on the monastery of Marmoutier, on the outskirts of Tours. Currently, scientific discussions are mainly held at the LAT as part of programmes that go beyond the ad hoc interventions of Inrap and SADIL. The urban archaeology programme initiated at the end of the 1960s has been able to continue thanks to the on-going support of the Tours municipality, demonstrating the fundamental importance of local involvement through constant dialogue between elected representatives, managers and researchers. One notable outcome of the cooperation between teams orchestrated by the LAT was the organisation of an exhibition in 2006, followed by the publication in 2007 of a book edited by Henri Galinié, *Tours antique et médiéval. Lieux de vie, Temps de la ville. 40 ans d'archéologie urbaine*. This was followed in 2012 by another symposium on urban archaeology held during the 137th CTHS (*Comité des Travaux Historiques et Scientifiques*) conference entitled "*Composition(s) urbaine(s)*", which led to the publication of *Archéologie de l'espace urbain* (Lorans, Rodier 2013).

3. Computerisation, modelling, new approaches

3.1. Geographic information and spatial analysis systems

Geographic Information Systems (GIS) have made a considerable contribution to urban archaeology, first by providing management tools for storing, manipulating, processing and posting data, and secondly by changing completely the way that information is analysed and interpreted. These two frequently related aspects concern the dual need to manage large quantities of primary data from multiple sources and to reason at the level of the urban space in order to understand the town as a whole. Setting up information systems in urban archaeology thus faces two major difficulties; first to manage all the data while also finding answers for specific research questions, and secondly to link the level of archaeological data acquisition centred on the materiality of the town with the processes whereby societies make and transform the urban space.

Spatial analysis methods were first used in archaeology in the 1970s. In the last twenty years, GIS have become ubiquitous; introduced at the

very end of the 1980s, its use became widespread in the mid-1990s. At the same time, archaeologists benefited from advances in remote sensing and analyses derived from the earth sciences.

While GIS is not the only spatial analysis tool, its use in archaeological work increased rapidly in the 2000s, as it has applications in all aspects of spatial information in archaeology: data collection; database constitution, management and access; making use of the databases through analysis and spatial modelling. Whatever its use, GIS provides wide-ranging results that were previously inaccessible; comparison of different types of data; cross-referencing sources; systematic processing of large quantities of data; access to analysis, modelling and display tools. Moreover, GIS entails prior modelling of the data, which requires formalising the implicit, and which itself adds significant value to the results.

The use of GIS in archaeology not only enables the data processing of spatial information, in other words the acquisition, selection, representation and layout of the data, but it also provides a strong potential for analysis, by ensuring the link between semantic and spatial aspects of archaeological information on the one hand, and by providing access to the spatial properties of archaeological entities on the other (Rodier 2011). This has consequences on how archaeological data are interpreted. In this regard, GIS, often presented as a decision-making tool, becomes a tool for assisting research.

The archaeological argument is based on space, but usually implicitly. In all cases, it invariably refers to space in terms of the proximity or connection of archaeological objects, their relation to geographic space, or their spatial distribution. This argument is too often made without reference to a theoretical base, although the latter was largely established by British archaeologists at the end of the 1970s (Clark 1977; Hodder, Orton 1977), and of course based on the work of geographers (Haggett 1965). The theoretical framework for the use of GIS had been largely established prior to its arrival in the archaeologist's office. It is undoubtedly not by chance that these tools were adopted earlier in Britain than in France, not only in archaeology, but in the human sciences in general. By contrast, it is now acknowledged that the rational use of GIS applications to process archaeological data enables, or imposes, better organisation of information systems and can allow new issues to be tackled.

3.2. The ToToPI GIS: Topography of Pre-Industrial Tours

It was decided to develop an open information system in Tours, integrating data as and when research topics were processed. When it was set up in 1996, the ToToPI GIS (*Topographie de Tours Préindustriel*) was

seen primarily as a research tool. It was not a question of creating a management system on the lines of an "archaeological urban map", but of using a GIS as a research tool, on the lines of the *Archives du Sol à Tours* (Galinié, Randoin 1979), for the spatialisation and spatial analysis of archaeological data. The system should be able to answer research questions concerning the antique, medieval and modern town of Tours. These priorities, set in advance, had consequences on both the structure and the form of the final "product". In effect, the system had to integrate all historical topographic information so that it could be analysed thematically, chronologically and spatially. The tools used had to be easy to handle by the researchers, without having to develop a specific application whose main disadvantage would have been to restrict the analyses to the functions that had been installed.

The first step involved setting up the geographic database from the reference spatial data. In this way, three layers of information were integrated: the current cadastral plan, the 19th century cadastral plan, and the area covered by the archaeological excavations. They constitute the geographic referential frame of ToToPI. All the other layers of information, regarding both graphic and semantic data, are constructed and organised as and when the research programmes are developed for studying the town. The quality of the input (geometry, precision, level of work and of analysis) is determined each time, depending on the aims of the programmes, which come within four lines of research:

- historical topography organised around a database with thematic and chronological input at the town level;
- processing and interpreting archaeological field data using a process ranging from recording excavation data to their analysis in the laboratory, i.e. from georeferencing to spatial analysis at the excavation site level;
- urban morphology through statistically processing the orientations of the plot boundaries in the 19th century, which revealed three major orientations on the plan (fig. 2). Two of these can be explained easily by the shape of the town and its relationship with the river. The orientation of the boundaries in ochre is determined by the inertia of buildings aligned with the river, while those in green to the west follow the slope of the left bank towards the canal linking the Cher and the Loire. The westward slope is found both in the south of the densely urbanised zone where it corresponds to palaeochannels, and also, as a result of successive developments, to the limit of the ochre and blue patterns. One can be fairly certain that this is not an artefact, because its limits correspond to clearly identified constructions, notably the *castrum* of Saint Martin in the south; the hypothesis, based on cross-referencing
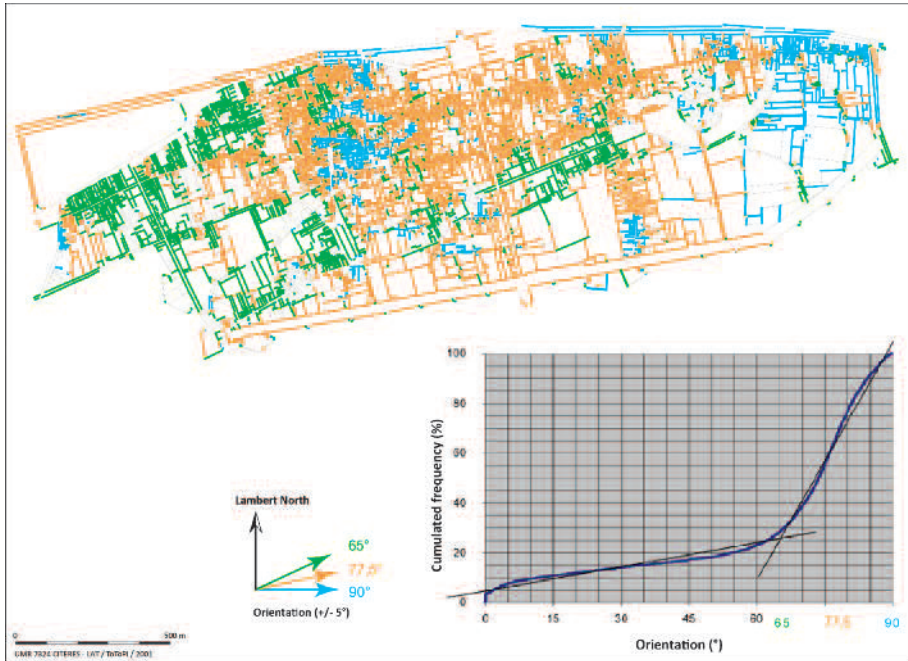
Fig. 2. Tours, statistical analysis of plots orientations in the 19th century.

the available sources, is that it indicates a major reorganisation in the first half of the 10th century, initiated by Téotolon, dean of Saint Martin's and then Bishop of Tours (Galinié *et al.* 2003);

-   assessment of the archaeological potential by modelling the urban soil at the town level. In Tours, the anthropic deposit varies in thickness from 3 to 10 m (fig. 3). It is more or less stratified and more or less well preserved. Cross-referencing archaeological, geotechnical and geological data enabled the natural levels and thickness of the anthropic deposit to be modelled, first at the level of the former urban space, as part of the thesis of Amélie Laurent (Laurent, Fondrillon 2010), and then extended to the whole urban area in the post-doctoral research of Eymeric Morin (Morin *et al.* 2014).

3.3. The historical topography of the OH_FET model: historical object, function, space, time

Historical topography includes the initial organisation of the documentary systems, a permanent tool to deal with any other subject, and the outcome of the urban space analysis. It is undoubtedly the approach that required the most time and energy, but also the one that produced most
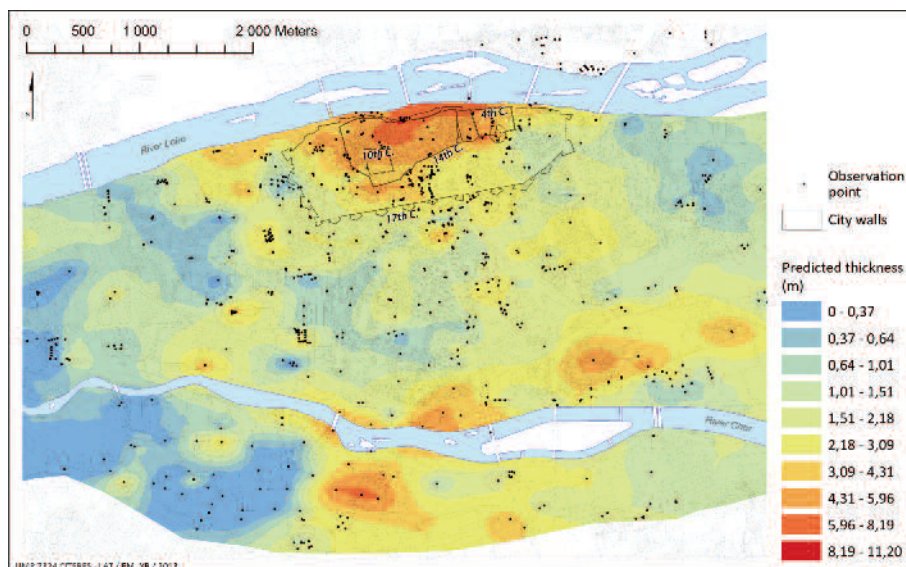
Fig. 3. Geostatistical model of the thickness of anthropogenic deposits in the alluvial plain of Tours (R2: 0.64; mean standardized error: _0.003; average standard error: 1.13 m).

results, particularly through its contribution to data modelling, which subsequently took various forms.

In the domain of the topography studied over the *longue durée*, the relevant information was derived from three main sources:
- the material elements, either underground or standing;
- written records, either direct or narrative;
- graphical representations, views, plans and photographs.

Documentary items or basic elements of the topography of the town include any built or natural element present on the ground at a given moment, whether they have been modified or not, and which thus form part of the urban landscape (Galinié, Rodier, Saligny 2004). For example, it could be a house, a workshop, a temple, a church, a castle, a market place, a public fountain, a town hall, a quay, a rampart, a street, a square, an abbey, or an allotment, but also an orchard, a field, a river, a hill, etc. A single element can be referenced in many ways. One former state may have been discovered during excavations, a later state may have been documented in written records and plans, the final state may still be standing or present in whole or in part. For each topographical element, its function must be interpreted at two levels: its use value and its urban value. For example, a construction is a workshop (use value), from which it can be assumed that there was an artisan sector in the town (urban value).

The topographical elements of a town can be categorised in a number of essential urban function groups. There are many examples of such grouping systems in contemporary archaeological or historical bibliography stemming from urban geography (Heighway 1972; Van Es, Poldermans, Sarfatij 1982; Lepetit 1988). None of them are definitive. The thesaurus drawn up by the CNAU has proved its worth since 1990 (fig. 4). It is easy to use when looking for categories to efficiently classify a *domus*, a convent, an arsenal or a railway station. The aim is to study the transformation of urban space in the *longue durée*, by selecting individual elements that can provide knowledge of the functioning of the town and that are considered as the base unit; it would be the building and not the wall, the burial ground and not the tomb, etc. As is often the case, they are given different names as the research progresses (constituent element, functional entity, urban object, urban landmark). On completion of the OH_FET model (*Objet Historique, Fonction, Espace, Temps*), we decided to use the term "*Objet historique*" (historical object) (Rodier, Saligny 2010). Producing the OH_FET involved three key steps.

1. Roads, development
   11. thoroughfares, streets
   12. unoccupied spaces
   13. riverbank works
   14. landscape works
   15. crossing points
   16. water supply systems
   17. sewers/drains
   18. monuments, vestiges
   19. unspecified monuments
2. Defence and military structures
   21. urban defence systems
   22. fortified structures
   23. garrisons, barrack buildings
3. Civil constructions
   31. public spaces
   32. civil authorities, justice
   33. education, culture
   34. health
   35. entertainment, sports
   36. baths, thermal baths
   37. private houses
4. Religious buildings
   41. pagan worship
   42. buildings for Catholic worship
   43. convent or monastery buildings

   44. ecclesiastical buildings
   45. worship other than Catholic
   46. parish churches
5. Burial places
   51. burial area
   52. parish cemetery
   53. special burial place
6. Trade, crafts, production places
   61. trade, markets, shops
   62. crafts, workshops
   63. agriculture, livestock farms
   64. manufacture, industrial premises
   65. extraction, quarries
7. Natural formations
   71. coast lines
   72. rivers
   73. marshes
   74. colluvial events
8. Other
   81. unspecified
   82. no confirmed occupation
   83. abandoned
9. Non-urban
   91. complex settlement of a non-urban character
   92. peripheral structure

Fig. 4. Urban values (1 to 9) and use values (11 to 92) according to the CNAU thesaurus.

The first step was to formalise the objects of historical topography. This involved a strictly topographical and functional approach to the town (Galinié 2000). The primary aim was to characterise the objects making up the urban landscape in an *espace-support*. The methodology used is linked to the methods of archaeological classification and to the knowledge of relational databases. Studies carried out in Paris for example (Noizet, Bove, Costa 2013) show how a robust base can yield valuable and varied outcomes.

The second step was to investigate the spatial properties of the historical objects. This involved the geographical modelling of the archaeological entities (Galinié, Rodier, Saligny 2004). It was based on a geographical approach to the urban space (Galinié 2000) with the aim of analysing the spatial dynamics. It corresponds to the appropriation by archaeologists of certain geographical concepts and the use of GIS.

The third step was to isolate time in the analysis of the time-space processes so that it was no longer subject to space. In some way, this involves the reappropriation of time by archaeologists/historians in the analysis of spatial dynamics. The objective is to analyse space and time separately. The approach is based on an analogy between the modelling and treatment of space and of time, taking the formalisation of the topology of temporal intervals in artificial intelligence as a reference (Allen 1984).

Designed as a means of studying the urban fabric, the OH_FET model was used first at the town level (Rodier *et al.* 2010) and was subsequently found to be highly relevant at the neighbourhood level (Lefebvre 2012). Indeed, at this intermediary level it is possible to thoroughly exploit the modelling principles applied for space, because it is only at this level that the survey can gather information about space continuously through historical objects that can be represented using areas. At the town level, the information is inevitably discontinuous, and a large number of historical objects can only be represented by a point. The experimental use of the model at the excavation site level involves choosing the type of modelling to deconstruct the initial information, which raises new questions (Lefebvre, Rodier, Saligny 2012). Above all, it provides a fresh look at stratigraphic excavation data, calling into question the robustness of the way they are recorded. The levels of application produce different outcomes for each of the three dimensions of the model.

In order to gain knowledge of the historical topography of a town, the following steps are required for each historical object, while ensuring access to evidence:
- identification of the object at the relevant level, according to the objective that has been set and the state of knowledge;
- assessment of the different sources of information about it;

- establishing the location and duration of its use.

For an element to be relevant for the inventory, the available information about it must provide the answers to three very basic questions:

What is it? A historical object must be identified by its function. It must be possible to establish whether it is a house, a workshop, a cemetery, a church, a quay, a rampart, a ditch, a river, landscape work, etc. In practice, it could be part of the house or workshop once the functional interpretation of house or workshop has been established. By contrast, a wall with an undefined function, a single tomb discovered fortuitously, or a refuse pit without any context, are of no interest here, as the objective is not to make a survey of all the existing information but to select the relevant information.

Where is it? The location of a historical object must be pinpointed. At the town level, objects are represented by a point (house, workshop), a line (street, rampart, river) or surface (square, burial site, field, cathedral close, *forum*, enclosure). The precision of the location is relative, varying from the level of the block to the level of the plot. The outlines of fortifications and streets frequently contain approximations. The exact areas covered by cemeteries or burial grounds are rarely known. Nevertheless, it must be possible to georeference the location.

From when to when? Once a historical object has been identified and pinpointed, it must be situated in time. The start and end of its function must be established. For each object, duration is expressed by the calendar dates of the beginning and end. A precision or uncertainty value is given to each date. For example, an exact date can be given for Martin's tomb (397), whereas 301 indicates the 4th century for the creation of the cemetery where his tomb was established.

Every historical object must thus be identified in terms of its function, location and date. It follows that a change in function or form corresponds to a change of object. For example, a monastery that becomes a parish church in the same place should be considered as a new object. The useful information is two-fold: the creation of a church and the disappearance of a monastery. In this case, function and dating change, and only location remains the same. Depending on the case, a change of form or area covered by an element can or must lead to a change of object. A cathedral attested by the presence of a bishop at a Council, and then by the remains of a Romanesque chevet, and then by the complete 13th century building, will comprise three distinct objects. The first is assumed to be found at the site of the following ones, the area covered by the second is unknown, and the third is precisely known.

The documentary system has four interacting levels (fig. 5):
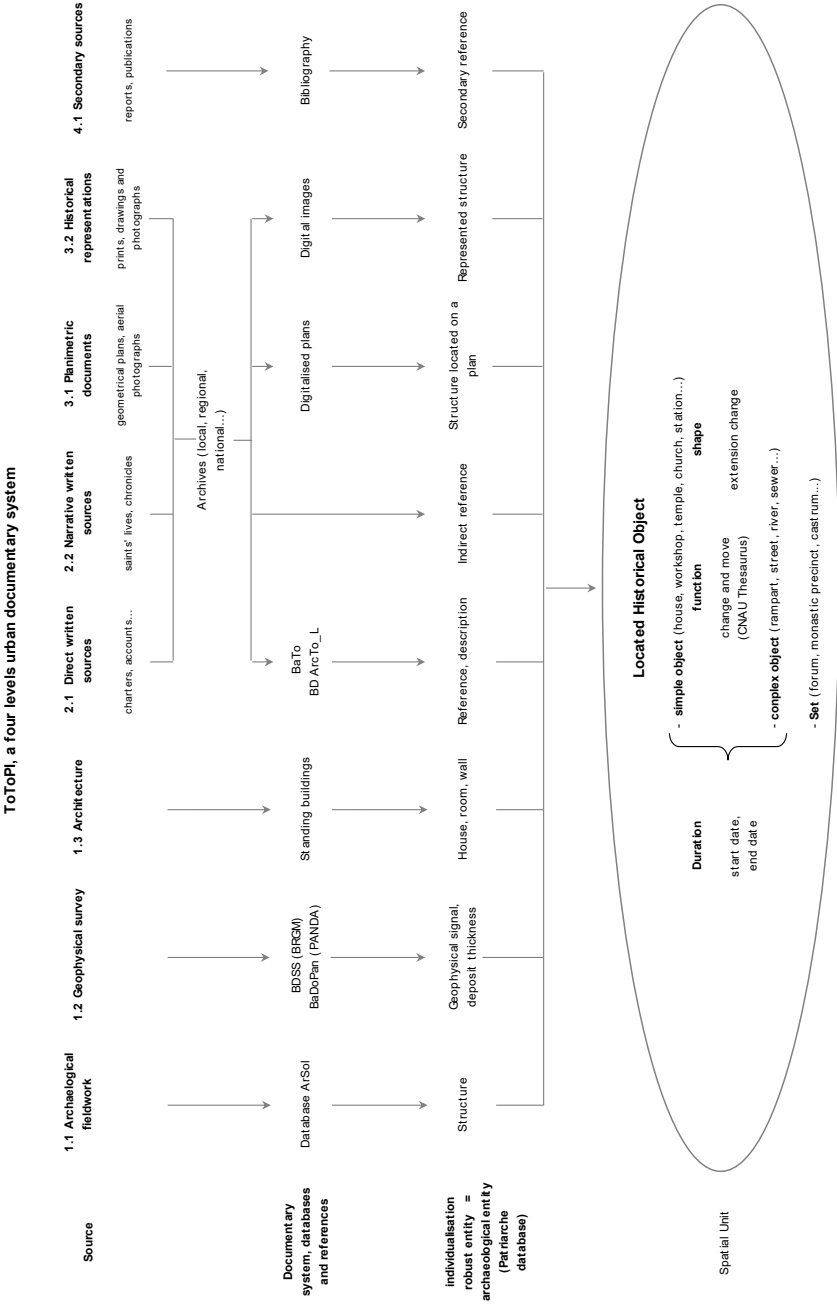- the sources;

Fig. 5. ToToPi, a four levels urban documentary system.

- the documentary systems that transform the sources into references once they have been critically assessed;
- comparison of the sources to identify the historical object;
- the historical object that has been located in space and defined as a robust spatial unit is entered into ToToPI.

ToToPI, based on the OH_FET model, has become the basic tool for research on Tours. For example, it enabled topographical information to be produced for the report of 40 years of urban archaeology in Tours (Galinié 2007a), and it was used for the archaeology theses on the town directed by Henri Galinié and then by Elisabeth Lorans: Amélie Laurent (2007), *Évaluation du potentiel archéologique du sol en milieu urbain*; Mélanie Fondrillon (2007), *La formation du sol urbain: étude archéologique des terres noires à Tours (4e-12e siècles)*; Bastien Lefebvre (2008), *Formation d'un tissu urbain dans la cité de Tours: du site de l'amphithéâtre antique au quartier canonial (5e-18e s.)*; Émeline Marot (2013a), *Morphologie urbaine et architecture civile au Moyen Âge: le quartier de la collégiale Saint-Martin de Tours de la fin du 10e siècle au 14e siècle*. It is also the reference information system for a thesis being prepared by Lucie Nahassia, *Dynamique des fonctions intra-urbaines dans la longue durée. Application à la ville de Tours*, jointly directed by Lena Sanders and Xavier Rodier. This thesis adopts an approach that places the town in the paradigm of complex systems to examine the processes of change underpinning the spatial dynamics of urban space over long time spans. The aim is to propose a model of intra-urban functional dynamics and to implement it with the help of a simulation model in order to observe the processes between the overall structure and local interactions.

4. New questions

In the conclusion of *Tours antique et médiéval*, Henri Galinié presented a table with three columns: facts established on the basis of current knowledge, elements that could change current knowledge, and suggestions that could challenge interpretative frameworks. Among the main unanswered questions, two are particularly complex:

- the possible existence of a protohistoric agglomeration more or less on the site of *Caesarodunum*, the open town of the early Roman period, and the chronological and/or spatial links that may have existed between the two;
- the nature of land use, the "ways of living", between the 5th and 10th-11th century; in other words, the eternal question of the passage from the Roman town to the medieval town, often considered as a simple "in-between" stage, or "*entre-deux*" in the words of Henri Galinié.

4.1. The protohistoric town

The question of the Gallic origins of the population of Tours has long been a subject of discussion between the partisans of a site on high ground north of the Loire, and those of a lacustrine town between the Loire and the Cher (Auvray 1938, pp. 170-173; Fréon 1948, pp. 352-355). The assessment carried out in the 1970s by Henri Galinié and Bernard Randoin (1979, p. 15) showed that archaeological data did not offer any certainty on the question. They concluded that the arguments were weak, which made any hypothesis of a lacustrine town very risky, and highlighted the need for in-depth observations over sufficiently large areas to be able to search for pre-Roman occupation, which could have existed anywhere in the town. Only a few coins (site 7) and a midden (site 012), discovered in the excavations that they themselves led, together with records of ceramics discovered in the 19th and first half of the 20th century, provide evidence of scattered and sparse occupation to the west of the Roman town. The circumstances of these discoveries, poorly documented for the oldest and observed on areas that were too narrow at the bottom of the excavations for the most recent, only justify a cautious hypothesis of residual Gallic occupation that cannot be differentiated from the start of Roman urbanisation in the first half of the 1st century AD.

It was this view that prevailed, leading to a large number of hypotheses, until the question was reappraised following new discoveries in the early 2000s. Four major elements now suggest that there was a sizeable and structured Gallic occupation to the west of the Roman town. The first concerns the excavation in the Rue Jules Charpentier, led by Raphaël De Filippo (2007, pp. 199-206) and whose study is nearing completion. It found evidence for a structured Gallic occupation, characterised by numerous structures excavated in the alluvial sands (middens, industrial pits, ditches, silos and postholes), a roadway, a semi-underground iron workshop, and a large ditch 6 m wide, associated with a probable earth embankment, that can be interpreted as a defence system. The abundant ceramic objects were the subject of an initial study (Riquier 2007), which concluded that there was a dense but short occupation in the 2nd century BC. The pursuance of this currently unpublished study of ceramics in 2011 enabled the three-century gap to be filled by showing continuous occupation since the 2nd century BC.

In 2011, another excavation a little further east, in Rue Gambetta, led by Anne-Marie Jouquand, revealed a Roman plot system, substantiated by alignments of postholes, prior to urbanisation, dated about 10 BC-15 AD and continuing up to about 250 AD when the houses were abandoned. These observations, which were made thanks to the possi-

bility of having access to sufficiently large areas to excavate such remains, indicate the introduction of the grid pattern of Roman urbanisation around the start of the Christian era, as in other towns in the west, illustrated by the recent excavation work of Gaétan Le Cloirec at the Jacobin convent in Rennes for example (http://bibliotheque.numerique. sra-bretagne.fr/items/show/3438). Furthermore, the excavation showed the absence of Gallic occupation at that site.

Several studies have involved modelling the subsoil of the former urban space and of the alluvial plain between the Loire and the Cher (Laurent, Fondrillon 2010; Morin *et al.* 2014). By bringing together archaeological, geological and geotechnical data, they provide a detailed model of the alluvial surface and a new interpretation of the flow of water in the alluvial plain. These new data suggest the possibility of the first settlements not built in flood areas.

Finally, current work by Sandrine Riquier on previously discovered Gallic objects shows that the quantity and quality of the objects corresponds to occupation that was more than sporadic, although it is not possible to define the structure of that occupation due to the limited documentation about the finds.

The hypothesis of Gallic occupation to the west of the former urban space is no longer in doubt. It is now a question of searching for additional evidence in future excavations in order to characterise it better. Thus, *Caesarodunum* was not created *ex nihilo*, but *ex novo*, as shown by the excavation in the Rue Gambetta.

4.2. Occupation in the early Middle Ages, or the difficulty of understanding the "entre-deux" *town*

Tours, like the vast majority of towns in the Roman world, experienced profound changes starting in the 3rd century:
- the contraction of the urban space, marked by the abandoning of residential areas, essentially to the west of the town;
- the creation of new funerary spaces on the site of these areas, such as the cemetery where saint Martin was buried in 397 (site 7), and also even further west, in Rue de la Victoire (sites 8 and 06) and Rue Georges Courteline (site 82);
- the change of use of public buildings, clearly illustrated by the defence of the amphitheatre at the eastern end of the open town in the 3rd century;
- the demolition of some of the ancient public buildings;
- a shift from building in stone to building in timber and earth, identified by postholes or trenches;

- a new way of dealing with refuse, by keeping it on site, buried in pits or spread on the ground, rather than taking it outside the town.

The inventory and analysis of all the archaeological structures observed in Tours and dated between the 4th and 10th centuries formed part of the Master's thesis of Emmanuelle Guinehut undertaken between 2012 and 2014. The resulting corpus revealed that nearly all the elements, from thirteen sites, took the form of hollowed-out structures, such as pits, ditches and postholes. Only site 3, presenting evidence of elite occupation in the north-west corner of the *castrum*, revealed signs of masonry constructions from the 5th-6th centuries. Elsewhere, it was not until the end of the early Middle Ages that stone was used again (Guinehut 2014, p. 50). A large variety of pits has been identified, including middens whose initial function is not always easy to determine, silos (from the 9th century), and latrines in the form of circular or oval pits from the 7th century, identified on four sites. Overall, this type of occupation, with predominant use of rubbish pits, belongs to the 8th-10th century and has been found outside the *castrum*, from east to west. In all cases, these dug-out structures go through levels of dark earth, making them particularly difficult to detect. It is mainly the concentration of movable objects, ceramics and butchery refuse, that make it possible to identify these pits, which can be considerably more than one metre in diameter and depth.

As in many other towns in France and elsewhere, the absence of timber houses is noteworthy, as is the very small number of sunken-floored structures that have been identified. Evidence of human occupation thus comes from secondary structures (including wells and domestic ovens), which have yielded a wide range of archaeological objects, including some that bear witness to diverse artisanal activities.

Conversely, and here again Tours is a typical example, a large number of burial places have been identified, with all the now familiar diversity of types (Lorans, Trébuchet, Joly 2007), including cemeteries connected to basilicas, funerary areas with variable numbers of tombs, ranging from a few to several dozen, and isolated tombs that are particularly difficult to date as they are generally dug through layers of dark earth (fig. 6). In site 6, the impression of dealing with relegated tombs is reinforced by the fact that the sixteen individuals observed were buried in a very disorganised way, facing different directions, at the foot of the outer wall in a ditch that was filled in during the 4th century. The graves are difficult to date accurately because the radiocarbon dating was carried out at a time when the reference frame was limited, but they cover a period from the 4th-5th centuries to the 6th or even 7th century. They contain no archaeological objects, indicating that bodies con-
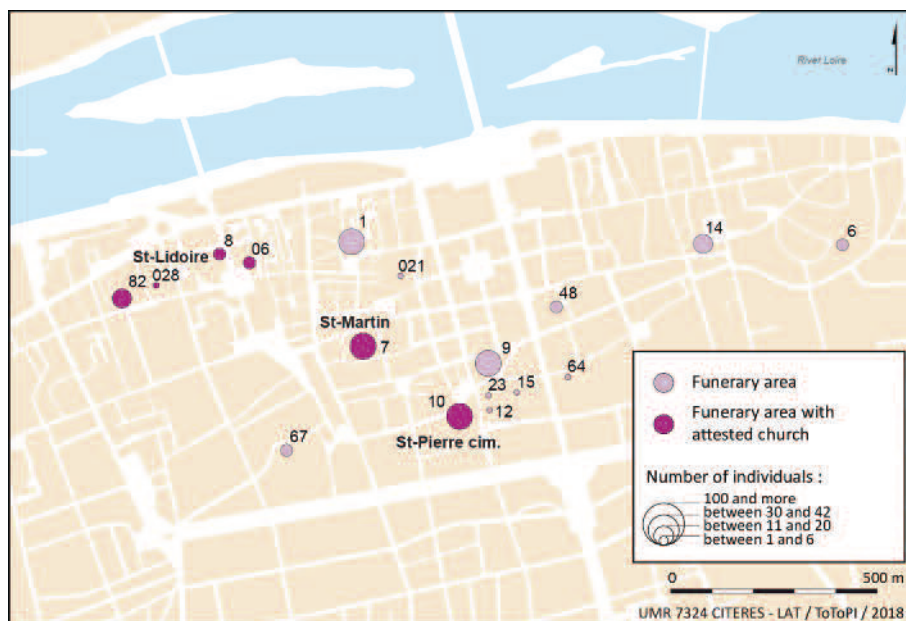
Fig. 6. Tours, location of excavated funerary areas between the 4th and the 10th centuries.

tinued to be excluded from the *castrum*, like the forty or so 7th-8th century graves observed on site 14 only about 50 metres from the cathedral, but with no apparent connection to a place of worship.

The identification of more or less densely occupied zones outside the *castrum* remains a difficult question, particularly as the first signs of what would become the bipolar structure of Tours appeared in the 5th century: in the east, the city, including the episcopal area, with a cluster of elite constructions in the north-west corner (Galinié, Husi, Motteau *et al.* 2014, pp. 47-57); in the west, the area that developed first around the tomb of saint Martin the bishop and then around the large basilica built in his honour and dedicated in 471, which gave rise to the construction of numerous satellite buildings, which Grégoire de Tours called the *vicus christianorum* in the last third of the 6th century (Pietri 1983). Thanks to textual and planimetric sources, it is possible to observe how the area placed under the authority of the collegiate church of Saint Martin expanded and was organised in the second half of the early Middle Ages (fig. 7): reorganisation of the religious landscape by adding, removing or changing the use of Christian buildings; the early 10th century construction of the *castrum sancti Martini* (Marot 2013b), followed by the network of streets between the outer walls and the Loire
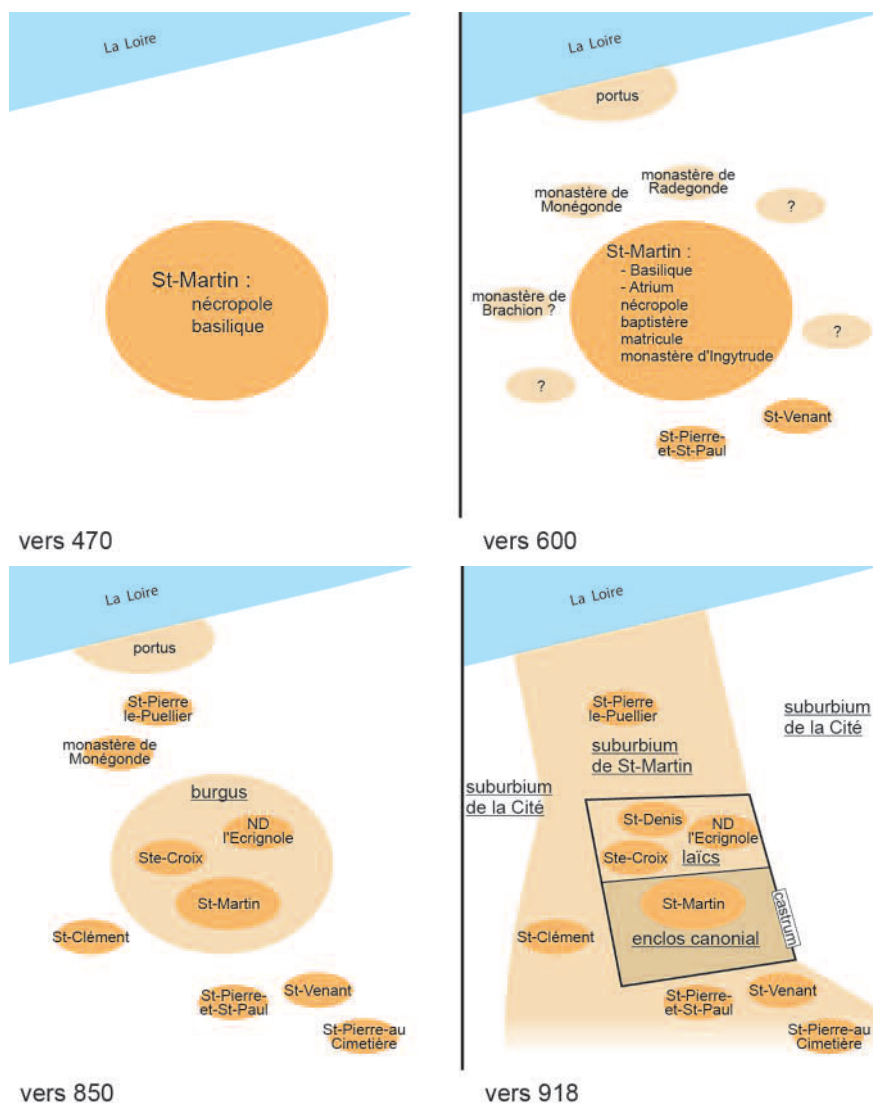
Fig. 7. From the 5th century basilica to St Martin's *castrum* and *suburbium* (Galinié 2007a, p. 366).

(Galinié *et al.* 2003). At the legal level, the development of this zone of activities, centred on the Saint Martin pilgrimage, resulted in the creation of a *burgus*, first mentioned in the 9th century, and then of the *suburbium sancti Martini* on land taken from the *castrum* and extending as far as the Loire where the canons established a *portus* (Galinié 1981;

Galinié 2007b; Noizet 2007). The recent excavation of sites 78 and 82, led by Nicolas Fouillet, raises questions about the extension of the occupied space on the western side of the collegiate church in the 9th-10th centuries (fig. 8) (Lorans, Jouquand, Fouillet, Rodier 2013, pp. 216-219). It seems that the zone that was occupied and/or used at that period extends beyond the western limit of the open town of the 1st-2nd centuries. One could no doubt imagine some piecemeal occupation on the outskirts, contrasting with denser occupation suggested by the outline
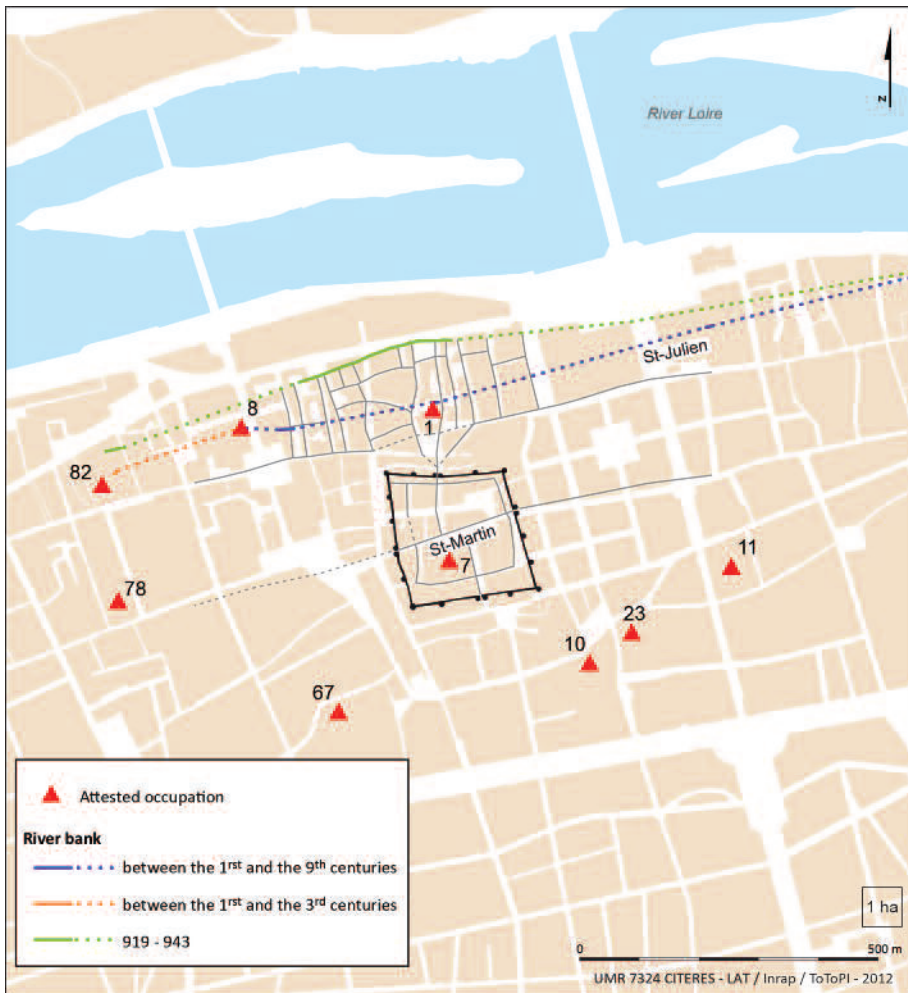

Fig. 8. St Martin's *castrum* and its surroundings in the 9th and 10th centuries (Lorans, Jouquand, Fouillet, Rodier 2013, p. 219).

of roadways between the *castrum* and the Loire built towards the middle of the 10th century; however, it is very difficult to have a clear image of the housing of this period from the very varied data. In effect, material, textual and planimetric sources provide very different information, and using them to reconstruct an urban landscape is highly risky. It is only in the 12th century that civilian housing started to be built in stone, particularly well preserved in and around the *castrum* of Saint Martin, and characterised notably by a large number of tower-houses associated with the development of an urban bourgeoisie (Marot 2013).

5. Conclusion

The history of urban archaeology in Tours over the last fifty or so years reveals the legal and institutional changes that have marked this discipline, and, more generally, French archaeology, which has developed over this period from amateurism, in the positive sense of the word, to professionalism. The transition from a more accessible topographical approach to a morphological approach and then to different forms of modelling, requiring new tools, notably the development of GIS, is one that can be found in a large number of French towns. However, it is regrettable that there are very few stable teams dedicated to the study of a single town and its surrounding environment, whose archaeological analysis is made possible by the rapid urban development of the main towns. It is now possible to have a better understanding of urban and peri-urban occupation, from protohistory to the modern period, raising new challenges, and also of networks of towns at a regional level in a given period (Garmy 2012).

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