Dating Urban Classical Deposits

Approaches and problems in using finds to date strata

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Synthesis and conclusions

Appendices

1. Self-archaeology compiled forms

2. The main sites
Acknowledgements

This book is dedicated to the many friends and colleagues who shared with me uncountable excavation and post-excavation activities. The many years of work together are the basis of this publication.

I wish to gratefully thank my PhD tutor, prof. J. Bonetto, for about fifteen years of advice, long discussions and field experience. I also wish to thank prof. A. R. Ghiotto, for his rigorous and constructive approach to the topic of this work.

The book is largely based on my PhD thesis; I am grateful to prof. A. Bevan, for having accepted to supervise me during the semester I spent at UCL, Institute of Archaeology, and for reviewing the thesis, prof. R. Docter (Universiteit Gent) for also agreeing to review the work and prof. D. Perring (UCL) for joining the commission as foreign member.

I also would like to extend my thanks to dott. S. Mazzocchin, dott. D. Dobreva and dott. A. Stella for their precious advice, provided at the time of my PhD, in the field of ceramics and numismatics; dott. E. Crema, dott. D. Francisci and dott. F. Da Re for providing me with fundamental help in statistical processing and approaches; the staff of the library 'Tito Livio', who gently provided me apparently unobtainable papers and I am particularly grateful to P. Cristofoletti and A. Muffato.

The thesis began to take shape as a MA dissertation, so I also wish to thank prof. A. De Guio, who was my co-tutor at the time and who provided me with very good advice when he suggested that I spend a period at UCL.

I also wish to thank the Archaeopress staff for the outstanding job done.

The PhD project was funded through a grant of the University of Padova, which is not just a whatever institution, by my hometown university.

Finally, I would like to thank Vanessa, for having heroically helped me during the last stages of the drafting of the original thesis and of this book, and, of course, my family, for unconditionally supporting me on every occasion.
Preface

Jacopo Bonetto, University of Padova

The stratigraphic revolution of the 1970s/1980s produced a sense of healthy optimism among the community of archaeologists engaged in field activity.

The progressive development of a rigorous methodology for reading the deposition of sediments as a product of human and natural processes contributed to the diffusion of shared techniques among field archaeologists; these techniques were based on the physical and mechanical principles of geological stratigraphy and made the practice of excavation a fairly reliable and well-organized form of registration of data.

The positive impact of the introduction of the stratigraphic method was based on rational, objective-theoretical principles, which eventually dismantled the subjective, asystematic approach (with insufficient documentary output), characterizing the large part of field archaeology of the previous hundred years.

This is not the place to propose an evaluation of this ‘revolution’ and of the actual effectiveness of the stratigraphic method, largely accepted in the United Kingdom and in Italy and occasionally introduced in other European and Mediterranean countries. Certainly, the codification of a series of operative and documentary practices stimulated the construction of depositional sequences, from which it was relatively easy to draw information to construct pluri-phase site histories, from prehistory to the contemporary age.

An important contribution to this methodology came from the introduction of the Harris matrix, a graphic representation of the stratigraphic history of the excavated sites. Many works, even recently, have expressed criticism of the undeniable aporias intrinsic to it, but the healthy debate on its validity does not reduce its importance, at least as a tool for ‘putting in order’ long and apparently inextricable sequences and for verifying, to some extent, the correctness of the observations formulated in the field, when those sequences in effect have been disassembled.

Since its entry in the archaeologist’s toolbox, the stratigraphic method has revealed all its extraordinary efficacy wherever it has been applied, but it has been particularly helpful in those so-called pluri-stratified sites, where the series of constructive and destructive episodes taking place in the same area for a long time (often more than a thousand years) is multiplied. This is the case in many modern urban centres, where rich sequences have been investigated in the frame of construction works carried out during the last century; it is also the case in Mediterranean urban sites which are no longer settled, but preserve rich stratification spanning the period from the Late Bronze/Early Iron Age to Late Antiquity.

In addition to the acquisition of a stratigraphic approach, particularly helpful for reading urban palimpsests, the last fifty years have witnessed the production of a series of systematic studies concerning many Greek and Roman finewares, representing the transversal evidence for the Mediterranean commercial networks from the Classical age to Late Antiquity.

Thanks to the works, among many others, of August Oxé and Howard Comfort (Corpus vasorum arretinorum, 1968 and 2000), of John W. Hayes (Late Roman Pottery, 1972), of Jean-Paul Morel (Céramique campanienne, 1981), of the authors of Atlante delle Forme ceramiche (1981 e 1985), of E. Ettlinger (Conspectus formarum terrae sigillatae italico modo confectae, 2002) or, more recently, of M. Bonifay (Etudes sur la céramique romaine tardive d’Afrique, 2004), we now have an impressive series of effective tools for recognizing and dating the most widespread ceramics circulating in the ancient Mediterranean and Europe. The chrono-
typologies produced by these studies, gradually improved and refined, have provided a milestone for discussing ancient commercial and productive landscapes and for analysing the chronologies of ancient stratifications with tools more reliable than local ceramic productions.

The present work arises and finds its place in the field of the conceptual and physical relations existing between strata and objects.

Nonetheless, before presenting the characteristics and aims of this research, other aspects of the current state of the art must be taken into account.

It has already been highlighted how, by the end of the last century, a high level of confidence, both in excavation techniques and in handling ceramics in terms of production and chronology, had been reached. Nonetheless, it cannot be asserted that the two research lines have developed in effective synergy. It is probably a caricature (but sadly, often, not too far from reality) to imagine on one side a field archaeologist carefully excavating single contexts, putting aside, with a hint of tedium, unstratified finds and, on the other side, a meticulous laboratory archaeologist, filing and classifying ceramics coming from poorly-known or completely-unknown deposits.

The procedure of excavation, already destructive in itself, has often produced the artificial separation of the study of stratigraphy and contexts from the study of the artefacts recovered within, therefore breaking down the composite reality of the stratigraphic context, where the single constitutive elements provide an explanation. It would not be fair to state that this phenomenon affected a large proportion of field archaeology projects during the last decades, but surely the widespread tendency to assign stratigraphic analysis and material studies to different professional figures – which is understandable for reasons of specialization – and the frequent difficulty – much less understandable – in stimulating a close interaction between the study of artefacts and the analysis of the excavated sequences must be noticed. A clear consequence of this state of the art is represented by many excavation reports or full editions, clearly unbalanced in favour of structures or strata, poorly employing the heuristic value of artefacts as indicators of formative dynamics, or, conversely, by works largely focusing on specific analyses of different classes of materials, fairly divorced from their original context; more frequently, excavation reports present an historical-topographic-architectural narrative and a separate section dedicated to artefacts, both rich but dramatically separated, also physically, even in different volumes.

Most probably this state of the art developed because the ‘stratigraphic revolution’ cited above stopped in midstream, perhaps producing a very refined technique for disassembling the stratigraphic palimpsest and for building sequences of actions and processes, but without focusing on the internal unity of contexts and on the crucial relation between the containers (strata) and the contents (materials).

In this way, the large operative field of the integrated elaboration of the data produced by stratigraphic analysis and by material studies has remained largely unexplored and uncodified, a field allowing the transformation of sequences in reliable, evolutive histories of ancient sites.

Among the diversified and hard paths for working out data from excavations, one aspect, although exceptionally important, was possibly particularly affected by this state of the art: it is the relation existing between the dates of artefacts and the chronology of strata (and sequences), a topic frequently tackled with the unforgivable superficiality of equating the two.

In this field there has been no lack, even in the recent past, of single important works, discussed in the first part of the volume here presented, but the results of these works and in general the very topic of the chronological relations existing between materials and strata formation processes, together with all its implications, have never been fully discussed among the community of field archaeologists.

This specific methodological issue and, more generally, other problems related to the processing of data coming from excavations have emerged, in their full complexity, in those urban Classical Mediterranean
sites investigated by the University of Padua since 1997. From this year, prolonged field campaigns took place in Nora, a Sardinian centre settled for at least 1500 years from the Phoenician age to the arrival of the Vandals, in Gortyn (Crete), the Greek and Roman metropolis displaying an extremely rich monumental palimpsest, and in the Latin colony of Aquileia, a site located literally between Europe and the Mediterranean and settled from the Iron Age to the Byzantine period. In all these Classical urban centres, excavations carried out in different architectural complexes (both of private and public nature) put into play thousands of contexts and tens of thousands of artefacts, to be combined to produce reliable historical reconstructions.

Among these three stimulating sites the author of the present volume took his first steps as a student and, later, as a researcher, moved by interest in the methodological issues inherent in the stratigraphic technique and in their possible consequences for the historical reconstruction of sites. This interest became the main topic of his master’s thesis and then it was developed in seminars and workshops held in Padua; eventually it became the topic of his PhD programme, of which this volume represents a meditated elaboration.

The three mentioned cities represented the formative and informative basis of this study, but the author has moved well beyond the narrow borders of the sites we investigated and, also thanks to periods of study abroad, he has examined many excavation reports from Europe and the Mediterranean in the context of the major topic tackled in this volume: the dating of stratigraphic sequences.

Nonetheless, if on the one hand the main question addressed is 'how a layer is dated', the volume does not represent a 'simple' manual for dating archaeological stratigraphies; the topic is critically investigated from different and varied points of view, taking into account the current literature, tackling the principles of the formation processes of stratification, moving to the qualitative analysis of the material record and then dealing with the statistical-quantitative study of finds, for gaining from materials and their dates indications on the absolute chronology of contexts and sequences.

In this way, a path of systemic analysis taking into account the informative synergies existing between the formation processes of stratification and the presence is followed, similarly, within it, of different finds, aiming to determine the best way the chronology of those episodes which led to the continuous mutation of the ancient cities can be defined.

The book deals with a variegated set of problems connected with studying complex archaeological sequences and it is meant as a tool for those facing the dangerous challenge of destroying a stratigraphic context so that they also take the responsibility of historicizing the gained data knowing the problems and the difficulties that this implies.

Digging makes sense only if it is done with care and rigorous methodology, following well-codified practices, as suggested by many manuals; but it is not enough. This work reminds us that, after having excavated well, it is necessary, when dating a layer or an event, to consider more accurately than in the past (although some remarkable exceptions exist). This is, after all, the main ethical-professional responsibility assumed by an archaeologist, because from dating derives the whole historical reconstruction, the ultimate goal of our work.

In this panorama, the methodological considerations proposed by Guido Furlan are all the more necessary to provide scientific rigour to the deciphering of urban stratifications, so that really credible dates and histories can be achieved.
Part I

Introducing the topic

I.1 Introductory remarks

I.1.1 The subject

How do we date strata? The topic of the book can be condensed in this question. The subject may appear, at first sight, both simple and evanescent; one may even wonder if it really deserves some research as it seems something obvious. On the contrary, others may consider coping with dating strata as too ambitious or challenging because of the intrinsic vastness and ambiguity of the matter. As I discuss further on, I consider it simply a necessity.

Dating strata is one of the most common activities (if not the most) routinely carried out by archaeologists (and that is why challenging the topic may appear useless or excessively ambitious – why should someone tell the archaeologists how to do what they already do so often?); in particular, it represents the core of post excavation analyses and it involves the crucial passage from a relative chronology to an absolute one. Dating is, ultimately, a necessary passage for moving (or trying to move) from excavation to history (and indeed it is an inescapable factor to be considered also in an anthropological perspective). This is because dating strata means dating the events and processes by which they have been formed and shaped; in other words, behind sediments there are actions, whether they are natural or anthropic, whether they involve transport or modification, deposition or removal.

The complexity and vastness of the topic do not take long in appearing. The Latin expressions *terminus post quem* or *terminus ante quem* immediately remind us that dating does not mean simply 'when?', but also 'after which moment?' or 'before which period?'; ‘how long did it take?’ may as well be added to the list.

Beside this, again, how do we date strata? Apart from some scientific techniques for direct dating, which will be briefly looked at in Chapter III.2, the most common answer, which may well be provided by everyone who has to deal with field archaeology, would be: ‘we date a layer through the materials recovered within it’. That is right of course. Today, as from the very beginnings of archaeology, artefacts (in particular) are the most important means of dating. It remains also obvious that this answer, by itself, is not enough. Indeed, this statement yields a second question, apparently something rarer: ‘how did the materials turn out to be embedded within the layer from which they have been recovered?’ This is a crucial point and large parts of this work will deal with it. I strongly argue that if we do not try to know how the materials we use to date one layer were embedded within it, we cannot truly date the layer itself, besides, possibly, through a mere *terminus post quem*.

The present work, at the sharp end, concerns primarily time and formation processes.

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1 See Munn 1992 for an overview and for several further references.
2 At the end of the 1980s, M. Carver observed that artefacts were still the most accurate method of dating (Carver 1989: 133). Despite the incredible improvements made in many fields during the last thirty years, this statement is still substantially true, at least in the field of Classical and post-Classical archaeology.
3 Fundamental in this sense, particularly for the questions posed, is Berry 2009.
I.1.2 The reasons

The reasons for the research are both personal and scientific. Before turning to the much more important scientific ones, I would like to briefly sum up the personal ones.

I already looked at the topic of dating deposits, very roughly, in my MA thesis, some ten years ago. At the beginning, the topic should have been limited to the study of residuality, its meaning, limits and potentialities. It was soon clear that it was almost impossible to fully tackle the issue by itself, as it was inextricably linked with a wide range of other topics. Thus, the subject gradually moved to dating as a whole. The idea of dealing with such a prickly matter originated from the countless discussions I had in the field and attending post-ex activities mainly with J. Bonetto and A. R. Ghiotto. In particular, the excavations carried out at the forum of Nora had just been published and we all had the impression that there was still much more which could have been squeezed out from the data collected. One of the problems was how to do it and that meant issues of theory and methodology.

Here the scientific reasons of this study arise: dealing with materials in post excavation, particularly for dating issues, soon appeared to be all but codified. Methodological issues were taken on piecemeal and spread over a potentially huge quantity of works. Moreover, large parts of excavation reports or complete publications dramatically missed (and unfortunately still miss) in presenting completely the data or the way in which they had been preferred to provide the dates presented.

The scientific reason of this work may thus be identified in the incredible lack of coherent and organic theoretical and methodological systematisation which lies behind such an important and common activity as dating deposits. I do not want to minimise what has already been written on the topic: in my view, what is mainly lacking is not content, but rather some ‘shape’ (very challenging in any way). I also do not want to suggest that the dates commonly provided for so many contexts, deposits, buildings, events and so on are wrong. What is missing is an explicit and structured approach, capable of positively answering the simple question ‘why?’, i.e. ‘why is this forum dated 50 BC?’, or ‘why do you think that this building was abandoned at the end of the 5th century AD?’, or ‘why is this refurbishment phase dated to the age of Tiberius?’ In one word, the issue is ‘justifying’ properly the dates we propose. What are the key concepts used? Which tools are available? How can they be used organically to achieve some date for the deposit being studied? These are the main questions from which this book begins.

I.1.3 The objectives

Given the premises discussed, the target of this work is effectively somewhat ambitious: providing a tentative but coherent and structured review of concepts and methodologies for dating deposits, along with a sort of problem-oriented taxonomy for their arrangement and the presentation of case studies for comparative purposes. At the very end the target is very practical, as it may be described as the improvement (even a small one!) in the quality of the inferences we make about ‘when’, during and after the excavation. I also hope that these lines, in their own small way, may help revitalise a debate on the topic, which has been undoubtedly poor over the last decades. In particular, during the last few years, spatial analysis has arisen as one of the major topics in the theoretical and methodological debate, while time is a key topic of few general works, rarely concerning the dating of deposits and the post-excavation analyses. The debate about formation processes has also decreased during the last two decades, however, also within this particular field of discussion, space and function have always been the favourite targets. If this work elicits even negative, but prolific critics, a good point would have been made.

\[\text{Currently, the best available and updated synthesis on the issue of dating contexts and deposits is probably provided in Carver 2009: 267-296.}\]
I.1.4 The 'playing field': what is in, what is out

Although the topic of dating deposits, as a whole, surely crosses the chronological and spatial borders of many fields of archaeology (Prehistoric, Greek, Roman, Medieval, etc.), I decided to clearly limit the field in which I will play the dating game. This is at least for three main reasons:

1. To cover exhaustively all the possible scenarios would have simply taken a lifetime.
2. My personal background clearly does not cover all the possible cultural, spatial or temporal aspects of the discipline of archaeology.
3. Every culture (a difficult term, indeed) and depositional environment display peculiarities deserving specific attention and that make them unique.

Besides the very contingent first two points, the third one takes on scientific importance.

Specific mixtures of physical, socio-cultural, political and economic factors, which could be considered as macro-systemic contexts (for a more precise definition and for the specific use of the expression which will be made in the rest of the book, see Chapter II.2.1), define the resulting archaeological record in peculiar ways. For instance, although clearly responding to the same physical laws and to many similar necessities, etc., a complex urban society and hunter-gatherer groups produce very different records through very different processes. To safeguard these peculiarities, a choice has to be made.

It was decided to focus on ancient, more specifically Roman, urban sites. Of course, going back to point 2, among all the possible scenarios, the one this present author knew best was selected, mainly in the light of several excavation campaigns carried out in Italy and abroad.

A Classical urban environment undoubtedly displays a high level of complexity and therefore represents a great challenge from many points of view. But which are the peculiarities that make a Classical (in this specific case Roman) urban site unique, looking at the formation processes involved? An attempt will be made to try and provide answers schematically (probably with some degree of generalisation), focusing on a few crucial points, which are particularly evident in the field of Roman urban archaeology, but which are to some extent typical of urban environments in general.

The continuity of human life within the same space for a long time is, obviously, one of the first appreciable characteristics of an urban environment. This, by itself, implies a high degree of transformation, complexity and palimpsesticity. This has indeed a positive, indirect consequence in relative dating, allowing to create long and sometimes narrow sequences in which actions and processes can be framed; but it still also presents some disadvantages in terms of absolute dating, because of the higher degree of mobility of artefacts due to redeposition (see point 3).

In general, natural formation processes (say processes in which nature plays the major role, although not necessarily an exclusive one) do not have a massive impact, at least during those periods in which the city and its countryside are well managed and in absence of great catastrophes. Conversely, they play a major role in non-constructed sites (Karkanas, Goldberg 2019: 9). The reason for that lies primarily in the fact that Roman cities are, in most cases, located in comparatively stable plain environments; moreover, Roman care for the maintenance of water courses is almost proverbial. Therefore, during periods of 'normal' management, episodes of colluvium or alluvium are very rare.

The other side of the coin of such an observation consists of the fact that Classical urban environments are exquisitely anthropic and anthropogenic environments, with all the pros and cons implied. Summing up, the human being is the major formative actor, although not the only one, in such an environment.

5 Conversely, they play a major role in non-constructed sites (Karkanas, Goldberg 2019: 9).
Particularly if compared to other building traditions, Roman architecture is particularly ‘aggressive’, meaning that it commonly involves the movement of substantial volumes of sediments and building materials, along with the use of numerous and differently skilled workers. These massive operations do not concern public buildings and infrastructures only, but can also frequently be observed in private architecture. This means that the urban environment is frequently re-shaped, even substantially. The movement or the excavation of large amounts of sediments for building purposes imply also a major displacement of sherds, with clear impacts on the issue of residuality.

Although myriads of exceptions may be observed, cities during the Roman period generally benefit from a complex system of waste management and disposal, of reuse and recycling. The existence of these mechanisms, discussed in Chapter III.4.1, heavily affects the record of a whole city, and makes it very different from a small rural settlement; it also has some precise consequences on the issue of dating.

In general, given the production levels reached, Roman deposits are usually rich in artefacts, mostly ceramic; they often produce also good amounts of numismatic evidence, which in turn, generally speaking, increases the level of accuracy of our chronological inferences. Quantity, as it will be discussed further on, counts.

All these above aspects typically characterise the field of play selected for playing the deposit-dating game. Of course, some concepts, methods or observations which will emerge may well be applied to other fields, but, in general, any mechanical transposition should, perhaps, be avoided; on the contrary, some critical and thoughtful application of some methods or concepts to other fields may turn out to be useful.

It is also worth noting that the boundaries of the playing field can get blurred. Sometimes it is very difficult to clearly separate what is Roman from what is pre- or post-Roman, or to clearly establish if a given settlement displays all the requisites of a town, or if it should be simply considered as a large settlement. This, moreover, would closely depend on the criteria preferred. Thus some flexibility and uncertainty have to be allowed for: some case studies, for instance, will be drawn from periods which would be considered by some as more applicable to the field of Iron Age archaeology, or to Late Antique/Early Medieval archaeology. I think that the issue of continuity itself (see point 1), which so evidently characterises the urban environment, allows some chronological flexibility in limiting the field.

Apart from the exposed chronological limits of the research, among the deposits forming Classical urban palimpsests a further selection has been made. As mentioned above, natural/geogenic strata are comparatively few in long-lived urban environments. But, of course, they exist and participate in shaping urban stratifications, particularly in open spaces; sometimes natural phenomena heavily affect the occupational pattern of many settlements (alluvial or colluvial episodes, occurrence of volcanic activity, etc.)

This work focuses only on anthropogenic deposits, because natural deposits, in general, involve processes whose deciphering requires a more robust geological/geoarchaeological approach. Soils, with their peculiar formative histories, are therefore excluded, as well as those deposits commonly known as ‘dark earths’, where anthropogenic and natural actors seem to play at least equally important roles. Some peculiar anthropogenic contexts, such as tombs, votive/ritual offerings, shipwrecks (indeed not typical of the urban environment!), and, to some extent, coin hoards will not be discussed, by reason of their unique formative characteristics and of their relative rarity.

Although the field had to be limited, the transverse nature of the book still manages, it is hoped, to emerge. It represents an extremely positive and stimulating feature, because anyone with some excavation and post-excavation experience can engage positively with the topic.

7 Karkanas, Goldberg 2019: 5.
I.1.5 Topics connected

The theme of dating deposits, although very wide by itself, is strictly connected with other topics which are not targeted by this book. This means that these topics will not be examined in detail (mostly because they would deserve a book of their own), but they will be touched on sometimes in relation to specific issues.

The most important of these ‘corollary’ topics is the dating of artefacts. This is not a study on the dating of artefacts, this is a study on how artefacts (and other ‘-facts’) are used for dating deposits. Yet the strict link between the two topics is very clear, as most often artefacts are dated thanks to their association to other finds in specific deposits, in a sort of circular relationship which may be very convoluted and which should really deserve much more attention in the literature. This very important topic is not addressed in this volume, but it is hoped that some of the considerations emerging may turn out to be useful on the subject.

The issues of grouping and phasing contexts, together with issues concerning excavation techniques and practice are also linked with the main topic of this book; these will also be touched upon sometimes, by reason of specific links with the topic of absolute dating of deposits.

The necessity of making some choices in shaping the matter of the book is also evident in the literature review proposed (see Chapter I.2): indeed, large parts of the history of archaeological thought and the development of field techniques over the last decades are taken for granted, although connected with the main topic. These, of course, would have deserved an independent treatise.

I.1.6 Structure of the book

Seeking for some structured working method (it being unavailable), the structure of the book is in some ways untraditional. Instead of a usual layout of data – analysis – synthesis, it was decided to start with a theoretical review, moving then to methods, and to taxonomy and case studies, therefore substantially reversing a more traditional order. This is because for moving from data to synthesis (inductively) it is taken for granted that the ‘way of moving’ (through which means, in reason of which theoretical framework, etc.) has already been established. In other words, we employ an already existing methodology for managing the matter and for making the data speak for the purpose we want (or at least so it should be).

In this case, it was resolved that starting from a body of data (but which data were important?), without having a clear idea of how to make them speak, would have been pointless. Conversely, we started from the basics, moving deductively/inductively and trying to provisionally test some of the expectations formulated. It is important to stress from the very beginning that the case studies presented were deliberately cherry-picked to show certain phenomena in the clearest way. The proposed approach can be considered somehow heuristic; almost infinite testing may be performed in the future and some of the theoretical and methodological tools proposed may consequently turn out to be confirmed, refined, or completely rejected. But at least, it is hoped that a basis has been laid down for further discussions.

According to these principles, the book is arranged into five main parts:

1. An introductory section with a review of the state of current thinking.
2. A theoretical discussion of the main key concepts involved on the issue of dating deposits.
3. An exposition of the main methodological tools that can be used for dating deposits, furtherly subdivided into quantitative and qualitative approaches.
4. A problem-oriented taxonomy of deposits, provided with depositional models for assessing how the assemblages can be used for dating; each type of deposit is followed by case studies, where the methodological tools exposed in the third part are used.
5. A concluding part with a synthesis of the working method proposed.

First of all, we will examine if and how a history of the way in which archaeologists date deposits can be traced.
1.2 Notes for a literature review

Just taking a quick look at the bulk of the literature concerning archaeological methods and theory, one can easily observe that the way in which assemblages are used for dating deposits (particularly in Classical urban sites) cannot be considered a topic by itself. Although dating strata is, indeed, one of the most common and historically rooted archaeological activities, as noted above, the literature on the issue is anything but organic and linear. Thus, in writing a review of the topic one must firstly acknowledge that several branches of the discipline have to be investigated to look for single scattered fragments of theoretical or methodological developments which contributed to defining today’s tools for dating strata.

In some way, however, our field of play must, again, have its correct marking before starting. As detailed earlier, in the following discourse the development of some topics, although closely connected to many issues of interest, will not be accounted for, basically because these topics already benefit from a more structured history, and/or because they would deserve more, and independent, space. This is the case with the huge topic of dating finds, ranging from typology and cross-dating to radiocarbon and thermoluminescence analyses. Writing a history of excavation techniques will be also avoided, although some important developments will be examined. Similarly, a complete and exhaustive review concerning the way in which assemblages have been used for dating deposits in past excavation publications would be, if not impossible, at least very difficult, even if focusing on Classical Archaeology only, as it is obviously populated by hundreds of on-going or finished excavations. However, some examples considered particularly illuminating of some developments will be discussed, again deliberately opting for a cherry-picking strategy.

The techniques of direct dating (OSL, mortar dating) are very recent and some notes are deferred to Chapter III.2; some notes on tools borrowed from other fields (ethnoarchaeology, experimental archaeology) are included in Chapter III.5; while papers concerning the important theme of waste disposal are indicated in Chapter III.4.1.

Another general note must be stressed before starting: most of the review draws on Italian and Anglo-Saxon literature. This is due to many reasons, among which my personal knowledge and background (archaeological, cultural and linguistic) have clearly played an important role. Nevertheless, except for the obvious attention paid to the Italian literature, the focus on the Anglo-Saxon material has clear historical reasons. Most of the theoretical and methodological developments concerning modern excavation techniques and post-excavation/interpretive issues have seen the light in this context, so effectively providing the largest part of those ‘scattered fragments’ mentioned above.

1.2.1 The beginnings

It is illuminating to start with a brief consideration of the way ancient writers perceived the world they lived in, i.e. their own ‘systemic context’ (see Chapter II.2.1). Pausanias’ Ἑλλάδος περιήγησις of the 2nd century AD is indeed the most striking testimony of the ancients’ perception of the palimpsestic nature of their urban environments. Most of the monuments, statues, objects, etc., described by the author are effectively ‘false residuals’ (see Chapter II.2.6) in their own cities. In other words, already 1850 years ago, Classical cities were composed of a mixture of structures and artefacts erected or produced in different times, and thus they displayed a high degree of chronological complexity. It is worth recalling this aspect because, surprisingly, it represents a key point in archaeological analysis often forgotten by archaeologists themselves. As will be discussed later, even assemblages embedded in primary, sealed-off deposits display this degree of complexity, which must be known and studied to fully understand their nature and dating. If, on the one hand, the explicit definitions of residuals and false residuals in

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9 This issue has been recently touched on by F. Rojas in his works on ancient antiquarianism and the ancients’ perceptions of the pre-Greco-Roman past (see Rojas 2017 for some examples).
archaeology are, after all, fairly recent, on the other their implicit notions are common knowledge now, and were common knowledge 2000 years ago. Apparently, archaeologists did not create something new.

Moving to the much more recent past, we can observe the more-or-less explicit adoption of some important principles at the very beginning of modern archaeology. C. J. Thomsen\textsuperscript{10} is famously known for having first adopted, in his \textit{Guide to Northern Archaeology} (1848), the three-ages system (Stone, Bronze, Iron). Less explicit are two other fundamental aspects of his work:

(1) the acknowledgement that tombs were privileged contexts for studying artefact associations, thus grasping their primary status; and

(2) the dialectic relation between artefact chronology and context chronology (so effectively laying the foundations for seriation and typology techniques).

Thomsen explains the matter in this way:

‘Towards determining the exact age of antiquities, or at least the period to which they belong, there is still another guide which hitherto has been but little followed with respect to the antiquities of the North, i.e. an investigation of the forms of the objects and of the ornaments with which they were decorated, with a view that by a careful comparison and by accurately noting what sorts are generally found together, we may ascertain the order in which the successive changes took place, and thus determine the periods to which a mere inspection of the ornaments will authorize us to assign the object’\textsuperscript{11}

We may conclude that since the very beginning of modern archaeology an idea of what is meant by ‘primary deposit’ existed, along with the implicit assumption that what makes these deposits very informative consists of displaying true associations (see Chapters II.2.3-6) among the embedded artefacts.

Thomsen’s intuitions become more explicit and are largely favoured in Flinders Petrie’s famous works on the tombs of northern Egypt.\textsuperscript{12} The primary status of tombs and their assemblages is exploited to provide the basis for a large seriation of artefacts,\textsuperscript{13} whose principles were first exposed in the \textit{Journal of the Anthropological Institute} in 1899\textsuperscript{14} and discussed again in \textit{Diospolis Parva} in 1901.\textsuperscript{15} Nonetheless it is \textit{Methods and Aims in Archaeology} that provides new, remarkably fresh considerations concerning the assemblage-context relationship. The presence is recognised of false residuals in some contexts\textsuperscript{16} and infiltrations are evaluated, implicitly acknowledging the presence and importance of sealed deposits.\textsuperscript{17} The primary status of other types of contexts, such as rubbish mounds,\textsuperscript{18} votive pits\textsuperscript{19} and collapse debris,\textsuperscript{20} is also recognised. All these considerations are still fundamental for considering the chrono-informative potential of a given deposit. In the end, Petrie went even further, realising the importance of vessel breakage ratios in seriation and in chronological issues in general.\textsuperscript{21}

\textsuperscript{10} See Trigger 2006: 121-129.
\textsuperscript{11} Thomsen 1848: 69.
\textsuperscript{12} Petrie is considered the father of cross-dating. His work will be later developed, among others, by G. Childe (1960, in particular 80-84 and 126-130). See also Patterson 1963: 391; and, more recently, Lee Lyman, O’Brien 1999: 185-215. See also James \textit{et al}.
\textsuperscript{13} 1998 for cross-dating and the building of an absolute chronology for the Iron-Age central Mediterranean area.
\textsuperscript{14} See Trigger 2006: 294-295.
\textsuperscript{15} Petrie 1899.
\textsuperscript{16} Petrie 1901: 4-8.
\textsuperscript{17} Petrie 1904: 145.
\textsuperscript{18} Petrie 1904: 145.
\textsuperscript{19} Petrie 1904: 147.
\textsuperscript{20} ‘Let us suppose some old country mansion, where it has been the habit to close permanently any room in which an owner had died, and leave everything in it undisturbed. If we went through such a series of rooms we could not doubt their order of date if we looked at their contents’ (Petrie 1904: 127-128). See also Petrie 1904: 148.
\textsuperscript{21} Petrie 1904: 16-17.
At the dawn of the 20th century, some key ideas, particularly in Petrie’s work, were more widely disseminated: in general, the existence of index fossils of given periods is obviously widely acknowledged, and cross-dating allows the creation of long sequences of artefacts from Egypt, Greece and Italy. Roman archaeology, on the other hand, still relies primarily on the abundance of other sources of dating. However, two points must be stressed:

(1) index fossils, a chrono-tool clearly borrowed from geology, are of some help when dealing with very broad periods or in seriating tombs or other primary deposits. Otherwise, as with every find, they just provide a terminus post quem; and

(2) the main focus is still on tombs and other particular contexts: urban dynamics are known to a certain extent, but proper urban archaeology still has far to go.

In fact, the acknowledgment of urban formative complexity can be considered a turning point for a mature development of dating techniques in this field, and this seems to have been achieved from the 1970s.

During the 1950s, Mortimer Wheeler was already introducing rigorous techniques for stratigraphic excavation and recording, but ceramics were still being studied as a group, with individual studies devoted to a few specific finds only. Curiously, Wheeler’s attention focused on the duration of accretion processes (in any event a matter of great importance), more than on when they happened. It follows that at this stage a serious evaluation of thehuge problem of residuality was, in fact, impossible, and therefore the complexity of dating urban contexts remained substantially unapproached. In this period, radiocarbon dating and dendrochronology are in the initial stages of their development, but it has to be stressed that from the very beginnings the notion of terminus post quem is acknowledged also when dealing with dated samples.

An early, but isolated, advocacy of interest in how finds reach deposits is contained in Pyddoke’s introduction (1961) to his work Stratification for the Archaeologist: ‘[…] an excavation report is not complete unless the writer sets out to explain the manner in which the layers were deposited. To understand his site properly the stratigrapher must always ask himself how his finds reached the position in which he discovered them’.

The author’s statement is certainly right but, unfortunately, for some time no practical consequences follow.

A few years later, the 1960s announce the advent of ‘New Archaeology’, with the fundamental entrance of quantitative approaches and computer science, finally providing fundamental tools for dealing with large amounts of artefacts (a key point which undoubtedly had a huge impact on postponing the development of techniques for dating deposits in urban environment). As S. Roskams stressed, developments in the archaeological discipline, besides that of individuals’ dynamism, are also the products of more general changes. He considers three elements as essential in this development: intellectual framework, available technology and organisation (of fieldwork). At the turning point of the 1970s, these three elements had made great progress; the premises for a major shift from cemeteries to settlements as targets, also for chronological inquiry, had been laid down. Starting from this moment, some main streams can be detected, although, as seen before, a linear evolution in the techniques of dating strata cannot be recognised.

For the sake of simplicity, these different branches are discussed separately, deferring an attempt to provide some synthesis and conclusions to the end of this chapter.

1.2.2 Urban Archaeology

In Italy, at least, ‘urban archaeology’ is usually understood as the archaeology performed in today’s urban environments.27 If, archaeologically, there is no substantial difference between an urban site which stopped existing, say, a thousand years ago and an urban site which still exists, from many other points of view the differences (organisational, economic, legal, political, social, etc.) are crucial, thus giving urban archaeology, so understood, its own autonomy and free-standing status. Historically the birth of urban archaeology is closely connected with the birth of contract archaeology and follows the post-war urban renewal of many western towns. This formative moment is thus spread over many years, according to the moment in which in different areas such urban redevelopment took place. The role of urban archaeology in the archaeology of urban sites (it sounds odd, but that is it) has been fundamental, as it was forced by necessities whose answers produced wider benefits. These necessities included new efficient, shared and codified ways of dealing with large amounts of data in shorter periods and the development of planning and sampling strategies. Also the use of communicational strategies to support the social role increasingly demanded of archaeology.

The first necessity led to two major innovations that greatly changed the way in which archaeology is commonly carried out, namely the single context recording system and the ‘Harris matrix’.28

From the point of view of dating deposits these two improvements are fundamental for two reasons: single context recording had a compelling effect, forcing archaeologists to look inside each context and evaluate, at least generally, its nature and meaning – a necessary step to evaluate its status. Meanwhile, the Harris matrix provided a system for producing reliable relative sequences, even when dealing with thousands of contexts, thus making available a basic relative chronology for complex urban sites and enabling a switch to the absolute dating of deposits.

The second necessity (planning) led to the growth of evaluation and sampling techniques. On their own these two aspects do not seem to directly affect dating, but the idea lying beneath these two aspects set in motion a wide debate which also had some consequences for dating. The core of the debate may be very roughly summed up by the slogan ‘total excavation vs progressive approach’.

The spread of excavation sites in many urban centres took archaeology out of a purely academic perspective and threw it within a world made of budgets, scheduled times, citizens’ needs, construction industries, and so on. One question arising from these experiences was key, i.e. is it possible to excavate a whole site with the same level of accuracy and to its whole extent? And if it were possible, would it be ethically correct?

In England, on one side of the debate, P. Barker and the Museum of London Archaeology (MOLA) pushed towards open-area excavations carried on with standardised techniques, with no substantial differences in excavation and recording strategy. On the other, scholars such M. Carver argued for a more progressive approach, scaling ‘intensity’ according to the informative potential of deposits and applying sampling techniques when possible,29 depending on specific research questions or agendas. Of course this is a very simplistic description of the issue and it does not do justice to many varied aspects and nuances of the problem. A better and more complete overview can be drawn by two more recent papers published in 1990 by P. Barker30 and M. Carver31 in the volume Lo scavo archeologico: dalla diagnosi all’edizione.
Here is not the place to discuss which approach is ‘better’ (even supposing it would be a useful and meaningful discussion).\(^\text{32}\) Both approaches (not antithetical at all) provide a fundamental background for approaching dating issues. This is not just a mere compromise position and I will try to demonstrate why. In the perspective of dating deposits, an open-area excavation with a standardised recording approach presents two main advantages.

One is that sampling problems involving assemblages and deposits are considerably reduced. This issue particularly affects secondary deposits and can lead to dates which are remarkable too old, even just the *terminus post quem*. Dating the construction of a whole building after having examined just part of the backfill of one foundation trench is, to say the least, hazardous. The established *tpq* may be much older than the actual one (see Chapters II.2.2 and IV.5).

The other advantage is that a minimum standard recording system at context level represents a necessity, as it allows in post-excavation analysis at least a raw evaluation of the nature of the context and the possible formative process related. The uniformity of the system makes the comparison of two or more contexts easier, thus facilitating the operation of grouping.

On the other hand, a more selective strategy yields a more critical approach to stratification, pushing towards the evaluation of the informative potential of contexts and thus permitting an early raw distinction between context and context, speeding up some interpretive work. Moreover, in this way extra analyses, sampling and data collection can already be pushed to the maximum during the excavation, whenever it seems appropriate.

Apart from some distinctions between the two approaches, both the figures of Barker and Carver directly and importantly contributed to the development of approaches to dating.\(^\text{33}\) Barker’s classic excavation manual, based on his experience at Wroxeter and Hen Domen, was firstly published in 1977, and it has, among others, the undeniable merit of having clearly tackled the use of *termini post quem* and *termini ante quem* when dating sequences.\(^\text{34}\)

Just a couple of years later, in Carver’s *Notes on some general principles for the analysis of excavated data*,\(^\text{35}\) some important lines of approach, based on the author’s 1974 experience at Saddler Street, Durham, were set down. The first part of the paper focuses on artefact seriation, for which context status is not taken into account, whereas the second part discusses in more detail the status of both contexts and assemblages. Contexts with primary status are those qualified by ‘assemblages which have relevance for the activities and culture of the inhabitants’,\(^\text{36}\) where the association of artefacts is reliable.\(^\text{37}\) Carver also warns that ‘only material from primary contexts may contribute to the absolute chronology’\(^\text{38}\) and reminds how too much effort has been devoted to sampling and dating secondary deposits. Carver’s message is pretty clear and correct; it is just worth noting that actually secondary deposits contribute to absolute chronology too, although with a mere *terminus post quem* (indeed within a whole sequence, it is the correct combination of all the three *termini* which leads to an absolute chronological grid).

These principles were already, at least partially, applied in Carver’s 1976 excavations at Sidbury, Worcester, which were then published in 1980.\(^\text{39}\) The report is extraordinarily important as it provides, albeit in a concise way, an early example of a publication in which the post-excavation process of phasing and dating is somehow made explicit, along with the principles which led the work. Contexts were identified according to their status as primary, secondary or redeposited (although it is not clear how the second and the third are understood) and then presented along with some indications about both the embedded

\(^{32}\) For more on the ‘open-area point of view’, see Roskams 2001: 31-34. See also Bradley 2015.

\(^{33}\) See also, below, the topic of residuality.

\(^{34}\) Barker 1977: 193-196.

\(^{35}\) Carver 1979.

\(^{36}\) Carver 1979: 8.


\(^{38}\) Carver 1979: 9.

\(^{39}\) Carver 1980.
Introducing the topic

materials and their identification (‘rubbish pit’, ‘pebble surface’, and so on). It is possible to detect a certain split between the stratigraphic sequence and the pottery seriation, which seems to have been carried out quite independently; indeed, residuality thresholds were marked not in relation to each deposit, but on an absolute scale, i.e. stating after which date a single vessel type could be defined as a residual.  

Before proceeding, it is worth briefly recalling how the necessity of improving the communicational aspects of archaeology, mainly with respect to the greater public interest, also involved important changes in scientific publications. Indeed, the need to make the excavation results public (archaeology could not keep on acting in isolation from the surrounding urban society) also responded to more pragmatic commercial demands, allowing the evaluation of ‘if, how and with which results’ the job had been done. This also generated great scientific benefit, compelling archaeologists to provide detailed data and interpretive syntheses. Carver’s report, among others, is also the child of these new necessities.

At the end of the 1970s the important topic of the status of contexts/deposits emerges, i.e. their informative potential (spatial, functional, chronological) within urban stratification. In other words, the attention focuses on their own nature. An important fixed point is represented in the 1979 work by P. Crummy and R. Terry (Colchester Archaeological Unit) *Seriation problems in urban archaeology*. It is an extremely important paper as it combines the topic of context status with the issues of residuality (see below), of ancient productive output and of breakage rates and wear. Some of these prompts will be touched on elsewhere throughout this study. Concerning the status of deposits, Crummy and Terry state:

‘In general, we can distinguish two categories of deposit which for the sake of brevity we shall refer to as class I and class II. Class I deposits can be defined as those derived from contexts where all the finds are in their original positions as either lost or discarded whereas class II deposits are those which contain residual material.  

Provisionally, at the risk of oversimplification, class I deposits can be listed as:

i. occupation layers on floors;
ii. destruction levels (except for the cases such as at Verulamium cited above);  
iii. middens (where the soil content is minimal and the original stratification undisturbed);
iv. grave goods;
v. primary deposits in some pits and ditches including cesspits;
vi. coin hoards;
vii. kiln dumps and loaded kilns;
viii. thick tip-lines in pits and ditches which consist of almost exclusively broken pottery and refuse where the soil content is minimal and much of the pottery can be joined together.

The two scholars continue:

‘The number of substantial class I deposits encountered on urban sites is probably very low [...].  

Class II deposits are then further split into IIa and IIb, according to a respectively low and high level of residuality and it is then noted that only class I and class IIa deposits can be used for seriation to improve the dating of finds.

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40 For Carver’s great theoretical, methodological and practical activity concerning urban archaeology, see also Carver 1985; 1987; 1989. The more recent Carver 2009 somehow represents a summa of his research.
41 Note the ambiguous use of two different parameters for defining the two classes, namely a spatial one for class I deposits and a temporal one for class II deposits (see below for what the authors mean by ‘residual’). See Chapters II.2.5 and II.2.6.
42 The clarification refers to the presence of residual sherds in brick-earth daub used for wall construction, as reported in Frere 1972: 9-10.
43 Crummy, Terry 1979: 54-55.
44 Crummy, Terry 1979: 55.
An in-depth discussion of this single article would deserve a much greater space; it is clearly based on instances coming directly from the urban excavation experiences gradually reached in those years. What emerges is a clear awareness that not every context is suitable for providing the same information and that, from a chronological perspective, the few primary deposits embedded in urban sites are the most important, as basically they do not contain residuals. The paper also provides a tentative definition of what a primary (class I) deposit is, along with a list of concrete archaeological examples. Implicitly the issue of false residuals (both in the cases of vessels or coins) is addressed.

Crummy and Terry’s work was published in the volume Pottery and the Archaeologist, where other papers also deserve particular attention. Among them, it is certainly worth recalling just a few lines from R. Jones’ introductory paper, as it represents a warning that should be always kept in mind when dealing with dating:

‘[…] perhaps we should be willing to admit that sometimes the pottery sample available from a particular site or deposit is inadequate to fix any date but the most simple terminus post quem. However, when faced with a report to write, most excavators feel duty-bound to express some opinion even on inadequate grounds’. 45

At the beginning of the 1980s important urban excavations are published throughout Europe and beyond, to some extent echoing the reflections and improvements achieved mostly from the work of British archaeologists.

A typical way of presenting the dating evidence in these years can be drawn from the volumes dedicated to the excavation of the M-M3 underground lines in Milan.46 Although some further details are provided throughout the paper, a complete presentation of contexts, status and material does not always appear. It does not mean, of course, that the post-excavation analysis did not reflect the achievements of the previous decades. What seems to emerge, most likely, is a problem with the publishing of the data, a problem which still affects a large sector of field archaeology.

In the same volumes, some papers are more detailed than others, dedicating independent paragraphs to the discussion of dating, and presenting recapitulation charts for each period.47 In general, it is worth noting a certain use of ex-silentio arguments (see Chapter II.2.11), along with a certain awareness of providing chronologies from a probabilistic perspective. Dating is indeed ‘proposed’ more than ‘imposed’.

The 1990s witness some new and interesting theoretical and methodological considerations, which find room, in particular, within the Interpreting Stratigraphy conferences, devoted primarily to post-excavation analyses. A full presentation of each paper would require much space and it would substantially broaden the discussion. Again, it seems better to focus on some areas of significant relevance. Among the papers presented at the conference held in Lincoln in 1992, S. Roskam’s article deserves particular attention as it focuses on the relation between materials and context status, providing a new, tentative classification and a brief review of previous works.48 Among the papers presented the next year in Edinburgh, K. Matthews’ paper investigates the formative and chronological aspects of those primary deposits usually named ‘occupation layers’,49 while among the papers presented between 1993 and 1997, published in 2000, the articles by M. Morris (ethnoarchaeology of abandonment debris),50 J. Gidlow (rubbish, recycling and scavenging),51 P. Clark (grouping),52 V. Buteux and R. Jackson (pit backfill dynamics),53 R. J. Pollard (fragmentation and assemblage formation processes)54 and P. Rauxloh (relational databases and residuality thresholds)55 deserve particular attention.

45 Jones 1979: 3.
46 Caporusso 1991.
49 Matthews 1993.
50 Morris 2000.
51 Gidlow 2000.
52 Clark 2000.
54 Pollard 2000.
By the end of the 1990s, in the field of urban archaeology theoretical and methodological debates seem to diminish. Although obviously important urban excavations were still being published, with even larger corpora of data made available, critical discussion within the discipline gets less and less discernible. This may also be a consequence of the end of large urban development plans in most western cities, but it is also probably affected by a widespread shift in archaeological interests towards new disciplines, such as spatial analyses, geo-physics, statistics, building analyses, etc., which seems to draw much of the attention in the field of archaeological methods and theory.

1.2.3 Behavioural Archaeology: objects

Behavioural Archaeology took shape in the United States in the early 1970s and it developed from New/Processual Archaeology, within a markedly anthropological framework. Its epicentre was the University of Arizona, with some major exponents such as J. J. Reid, W. L. Rathje, J. M. Skibo, and M. B. Schiffer. Its American origins led to an obvious focus on American history and archaeology, thus delaying its own impact on the archaeology of other cultures and on urban archaeology, which had a typically European characterisation. Indeed, within the current European theoretical debate, still saturated with the opposition Processual/Post Processual Archaeology, this school did not find much room.

What makes Behavioural Archaeology extremely interesting within the perspective of dating deposits through assemblages is the explicit focus on the people/artefact relationship at various scales. Of course, Behavioural Archaeology has evolved over the last decades, both through internal development and by external impulses, and it now embraces topics ranging from technological change to ritual and religion. Nevertheless, the field which is of interest when dealing with dating is still the very core of Behavioural Archaeology, i.e. the understanding of formation processes as a fundamental tool for drawing reliable inferences from the archaeological record.

It has to be stressed that, although the existence of two main groups of processes involved in shaping ancient systemic contexts into archaeological contexts was fully recognised, namely the so-called c-transforms and n-transforms (respectively cultural and natural processes of change), most of the focus has been devoted to c-transforms. This seems to be due to the anthropological approach which so deeply characterises American archaeology in general and Behavioural Archaeology in particular, with its typical attention to human behaviour. Certainly, a substantial corpus of literature concerns c-transforms too, but the wider theoretical trend remains clear and explicit.

This tendency presents pros and cons: natural formation processes, geological and micromorphological aspects and post-depositional processes step slightly to the background leaving mainly cultural processes in the foreground, which, in turn, are mainly pre-depositional and depositional. Indeed, in the Classical urban environment, cultural formation processes play a major role in shaping the record, simply because human activity lasted for long in the same place.

Moreover, as already mentioned, the ancients’ approach to the urban environment, in particular the Roman one, could be particularly incisive in terms of architectural effort, heavily modelling the space both above and under the ground. In general, a behavioural approach seems to suit well the area of study and the target addressed.

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57 For a useful collection of articles summing up the development of the discipline from the very beginning, see Schiffer 1995a. For a recent synthesis see Schiffer 2010. Perhaps, the most complete and organic work is still represented by Schiffer 1996 (first edition in 1987). Each work provides a substantial bibliography. See Lamotta, Schiffer 2005.
58 See Schiffer 2010: 6: ‘One day in 1972 Reid solved the definitional problem: archaeology, he insisted, was the study of relationships between human behavior and material culture in all times and all spaces’. It is curious observing how in 1972 Schiffer himself noted the opposite imbalance: ‘The branch of archaeological theory which treats these and related questions may be defined as the conceptual system that explains how the archaeological record is formed. As such, it has both cultural and noncultural components. The latter area has received major emphasis to date’ (Schiffer 1972: 156).
Some main points characteristic of this field of archaeology assume a certain importance according to the aims of the present work:

1. The theoretical shaping and distinction between systemic context and archaeological context (Figure 1; see Chapter II.2.1).
2. The consideration of formation processes as the link between the two contexts.
3. The distinction between c-transforms and n-transforms.
4. The notions of primary refuse, secondary refuse, de facto refuse.
5. The acknowledgement of the importance of the processes of reuse – recycling – lateral cycling, storage, transport, discard and maintenance (see Chapter III.4.1).

All these aspects have been discussed over the years, and they were developed particularly in the scope of American Southwestern archaeology, but a full display of these notions in European archaeology, particularly Classical, still has not been fully achieved.

One last aspect of this branch of theoretical and methodological thought needs to be stressed: clearly continuing a tradition born with New/Processual Archaeology, Behavioural Archaeology largely employs ethnoarchaeological and experimental approaches (along with quantitative techniques) when dealing with the interpretation of the record. The (underestimated) importance of these tools in dating is discussed in Chapter III.5 (ethnoarchaeology and experimental archaeology), below and in Chapter III.3 (quantitative approaches).

Concluding, it has to be acknowledged that Behavioural Archaeology, with its pros and cons, still provides, more or less explicitly, much of the theoretical framework for dealing with the complex relations people – artefacts – deposit, representing, in turn, the key to the use of materials for dating.

**I.2.4 Other approaches to formation processes: stratification**

While Behavioural Archaeology had its main focus on human behaviour, on the other, between the 1980s and the early 1990s, in Padua, another school returned to examining formation processes as a whole, this time, possibly, with a slight preference for natural ones. Theoretically this school, dealing mainly with Italian pre/proto history, can be considered a legitimate heir to the more mature forms of Processual
Archaeology, but some legacies from Behavioural approaches are indeed also present. G. Leonardi is to date one of the main contributors to this cause and the proceedings of an international seminar held in 1991 are still the cornerstone of the body of literature produced.\textsuperscript{59} Except for the slight shift to n-transforms as a privileged field of investigation (also due, I think, to the different necessities implied by dealing with pre/proto historic sites/ deposits), another important point marks the difference from Behavioural Archaeology, i.e. a great interest in sediments and soils (the matrix) and a close connection with geoarchaeology and micromorphology. This time the attention shifts from the finds to the deposit as a whole.

This jump 'back to the basis' has been indeed very healthy, as defining and understanding single contexts is the first, unavoidable step towards their grouping and then their dating. A knowledge of their general and specific dynamics, along with the post-depositional processes occurring, is a prerequisite that can never be taken for granted, but which has to be investigated, discussed and evaluated each time. The more the stratigraphic reading is difficult (see particularly 'aggressive' environments), the more such an approach, markedly geoarchaeological, shows its benefits.

One major theoretical contribution provided by the 'Padua School' concerns the topic of 'basins' or catchment/depositional areas. Up to now, the importance of defining the status of each deposit has been stressed and the attention has been focused on primary ones. Conversely, the shaping of the concept of 'basin' provides the tools for fully tackling the dynamics of secondary deposits, their formation and the way to date/non-date them. G. Leonardi proposes a basic distinction between physical and conceptual basins, with a further split into potential and specific basins and into source/catchment basins and depositional basins. The consequent concepts of 'local' and 'allochthonous' are also reviewed and shaped.\textsuperscript{60}

Among the issues discussed, it is of great consequence to recall at least the definition of 'source basin':

'corrisponde all’ambito spaziale e materiale da dove è stata prelevata la materia. Determina quindi il luogo di prelievo, la qualità e (teoricamente) la quantità della materia prelevata (che, tramite trasporto, sarà deposta nel bacino di deposizione)'.\textsuperscript{61}

These sections of the theoretical framework assume great importance, as they are the basics for coping with the issues of redeposition and residuality (see below) and they represent an important tessera to answer the question 'How did it get here?', i.e. the fil rouge of dating through assemblages.

This school has also been characterised by a constant attention to post-depositional processes; these are one of the causes of the presence of intrusive materials in assemblages, thus representing another important factor to be looked at when evaluating how to date a deposit.

In the same period, A. De Guio’s considerations about the nature of the archaeological stratigraphic unit itself (or context), with the acknowledgement of its operational nature,\textsuperscript{62} basically provided – an aspect which seems still largely unnoticed – theoretical foundations for the activity of their grouping in larger interpretive sets, a topic which is in fact connected with dating (see Chapters II.2.2-3). The author seems (provocatively?) to reject the idea that stratigraphic units have an actual, physical nature;\textsuperscript{63} in any event, recognising the dual role of contexts as both physical and operational entities, the issue of their dating can be handled much more effectively.

\textbf{1.2.5 The study of residuals}

A topic playing a fundamental role in the dating game in urban environments is represented by residuality. The topic arose, obviously, after the basics of archaeological stratigraphy, excavation and recording were

\textsuperscript{59} Leonardi 1992a. See also the pioneering work Leonardi 1988.
\textsuperscript{60} Leonardi 1992b.
\textsuperscript{61} Leonardi 1992b: 19.
\textsuperscript{62} De Guio 1988.
\textsuperscript{63} De Guio 1988: 9.
established and it is child of both urban archaeology and material culture studies. Although these studies are rooted in the 1970s, their main development occurred during the 1990s and the topic is still matter of some debate.\textsuperscript{64}

Residuality represents a phenomenon typical of urban sites, where the redeposition of large amounts of sediments and materials is very common. Indeed, residuality may be seen as a function of two factors: the intensity and invasiveness of building activity and the duration of human continuative settling in the same place.

Roughly speaking, we may observe that the combination of these two main factors is typical for urban sites, while their impact decreases moving to smaller, short-lived settlements.

A residual is a find definitely discarded in a systemic context predating the systemic context in which the deposit where it was recovered was formed (see Chapter II.2.6). In the beginning these finds were treated mainly as a problem, while the focus fixed on ‘dating materials’, i.e. the ones at least broadly contemporary with the formation of the deposit which embedded them. This approach is somehow evident both in Barker’s manual and in Carver’s first papers (Figures 2, 3); the identification of residuals was delegated to a form of empirical seriation of deposits.

The definition of ‘residual’ itself was not explicit. Nevertheless, already in those years residuality drew the attention of methodological considerations. The above-mentioned paper by P. Crummy and R. Terry also take on the topic of residuals, defined as ‘pottery and other finds which derive from occupation earlier than their respective contexts suggests’.\textsuperscript{65}

The topic was challenged again in the early 1990s by J. Evans and M. Millet: the title of the paper, \textit{Residuality Revisited},\textsuperscript{66} is self-explanatory: the informative potential of these materials is investigated, and their nature clarified.

Residuality seems to have been one of those rare methodological issues which also caught scholars’ attention in Italy, even in the field of Classical Archaeology; in fact, the phenomenon of residuality is quite evident when dealing with Classical and post-Classical stratigraphies, and its magnitude stands even clearer thanks to the great abundance of materials (ceramics in particular) produced, particularly, during the Roman period.

Indeed, the major recent works on the topic turn out to involve also Classical archaeologists. That is the case of \textit{i materiali residui nello scavo archeologico},\textsuperscript{67} a collection of papers edited in 1998 and completely devoted to various aspects of residuality. How the notion of residual remained fluid for so long is demonstrated by the different definitions opted for within the same volume. For C. Cecamore a residual is a ‘manufatto che, prodotto in un dato momento, dopo esaurita la sua funzione, si ritrovi in un contesto posteriore al suo periodo d’uso’,\textsuperscript{68} while R. Santangeli defines residuals as ‘quei reperti

\begin{tabular}{|c|c|}
\hline
\textbf{Structural Periods} & \textbf{Pottery Types} \\
\hline Z & g + f + e + d + c + b + a \\
& g + f + e + d + c + b + a \\
& g + f + e + d + c + b + a \\
\hline Y (ACERAMIC) & f + e + d + c + b + a \\
\hline X & f + e + d + c + b + a \\
& e + d + c + b + a \\
\hline W & e + d + c + b + a \\
& d + c + b + a \\
& d + c + b + a \\
\hline V & c + b + a \\
& b + a \\
\hline U & \\
& b + a \\
\hline T & \\
& a \\
\hline
\end{tabular}

\textit{Figure 2: Seriation as a tool for investigating residuality (Barker 1977).}

\textsuperscript{64} For a brief review, see Bonetto \textit{et al.} 2017 (in particular 67-70). See Haselgrove \textit{et al.} 1985 for the use of residuals also in unstratified contexts.

\textsuperscript{65} Crummy, Terry 1979: 51.

\textsuperscript{66} Evans, Millet 1992.

\textsuperscript{67} Guidobaldi \textit{et al.} 1998.

\textsuperscript{68} Cecamore 1998: 117.
Introducing the topic

Figure 3: Seriation of contexts and residuallity thresholds (Carver 1980).
che, esaurito il loro periodo di utilizzazione e stratificati, sono stati in qualche modo riciclati in contesti posteriori insieme alla loro matrice terrosa’ or ‘che restano in circolazione per un periodo di tempo più lungo dell’usuale’.

J. P. Morel, instead, prefers to simply consider residual ‘un oggetto la cui presenza sorprende per motivi cronologici, o funzionali, in un determinato contesto’, while E. Zanini proposes an original and stimulating definition of residuals ‘come componente antropica della matrice, o meglio come la parte della matrice di cui è più facilmente riconoscibile l’origine antropica’.

J. T. Peña considers a residual ‘any sherd initially discarded before the beginning of the formation of the context from which it was discovered as a residual’. Furthermore, the paper by Peña is extremely important because he wonders how much time has to pass between the end of the ‘systemic life’ of an artefact and its last deposition in order that it may be defined a residual. The issue, in turn, involves the topic of accuracy and the distinction between a continuous and a discrete view of time, both discussed in Chapter II.2.8.

The same volume also contains an important paper by N. Terrenato and G. Ricci, concerning one of the statistical tools which can be used for the study of residuals (and finds in general). This approach (the ‘weighted mean sum’) is discussed in Chapter III.3.5.

The turn of the 1990s apparently witnessed also the shaping of the concept of the ‘false residual’, namely a find which lived an extraordinarily long systemic life (heirlooms for instance).

After about a decade the topic of residuality was treated again in C. Tronchetti’s excavation manual, and then, more extensively, in a paper by E. Giannichedda, who considers residuals ‘ciò che non è pertinente al contesto dal punto di vista cronologico’; the approach proposed for their study and identification is very articulated and it uses a mixture of functional, contextual and chronological criteria (Figure 4).

Up to the present, although theoretical and methodological discussions on residuals seem to have ended, in material culture studies, when assemblages are presented, more and more often residuals, false

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Reperto in fase; giacitura primaria
Cimelio
Reimpiego
Residuo archeologico
Cimelio smarrito o residuo
Residuo stratigrafico; giacitura secondaria
Repto in situ
Sopravissuto
Non determinabile

Figure 4: Residuals, false residuals and reused materials according to E. Giannichedda (Giannichedda 2007).
residuals and in-phase materials are recognised and separated. The way in which this is achieved is, of course, a completely different matter.

1.2.6 Quantitative approaches

A much more extensive use of statistics and quantitative approaches in general is among the most evident legacies of New Archaeology. This small revolution within the discipline of archaeology was possible thanks to the more general development of computer science, which provided the essential tools for performing quantitative analyses. Historically, the two privileged fields of application of quantitative approaches have been spatial analysis and seriation, but soon also assemblages drew the attention of quantitative analysts.

The leading figures in this field are certainly represented by C. Orton, whose contribution to the ‘meeting of sherds and numbers’ is fundamental, and S. Shennan. Unexpectedly, quantitative studies applied to assemblages will not be fully drawn on for the present work. The reason can be traced back to the very peculiar nature of this field of studies. As stated in Orton et al. 1993: ‘We use the term “quantification” in a precise and restricted sense, to mean the measuring of the amount of each type of pottery in an assemblage, with a view to describing the assemblage in terms of proportions of each type present’. Indeed, the quantification methods developed over the years (see Chapter III.3.4 for further references) aim primarily to compare different assemblages and evaluate the economic impact of some types compared to others.

In short, quantitative techniques have not been developed for the investigation of chronological patterns. To perform this temporal analysis a simulative approach has been opted for in this present study (see Chapter III.3.5).

Archaeological simulation, as a quantitative approach to the record, represents itself a branch stretching back to the 1970s, but it has had an extraordinary development over the last two decades. As E. Crema rightly points out, the role of time in quantitative analysis is still somehow neglected, and, traditionally, simulative approaches have also mainly dealt with other issues. The role of chronological patterns, along with the fundamental topic of uncertainty, has been recently addressed by E. Crema himself, drawing on the comparatively recent body of literature concerning temporal analysis in general. In particular, he focused on the wide development of prehistoric Jomon pit-houses (Japan), but, as discussed in Chapter III.3.5, with further references, the same simulative approach can be selected to model intra-assemblage chronological data. As far as is known, a simulative approach (Monte Carlo simulation) for modelling assemblage chronological data has never been used before.

Other quantitative approaches to the chronology of assemblages (such as the above-mentioned method proposed by N. Terrenato and G. Ricci) are, again, discussed in Chapter III.3.5.

1.2.7 Synthesis and conclusions

As discussed at the beginning of this chapter, the picture emerging from the review is anything but organic; nevertheless the framework of the theoretical and methodological development that has occurred over, say, the last century, has been at least broadly sketched out (Figure 5). Moreover, although the overall image is still somewhat incoherent, some important links between the different branches outlined can be traced. One of these is the clear link that can be traced between urban archaeology and the development

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76 See, e.g., Panella, Saguì 2013.
77 For more references, see Chapter III.3.4.
78 See the classic Shennan 1988. For comparisons, see also the more recent Fletcher, Lock 2005.
80 An exhaustive literature review, with further updated references, is provided in Lake 2014.
81 Crema 2012: 441.
Figure 5: Hypothetical diagram illustrating the contribution of different branches of archaeology to the issue of dating deposits.
of studies concerning residuals, which, in turn, employ some quantitative techniques. What keeps these issues together is, indeed, the urban environment, with its high rates of change and redeposition and its abundance of products (ancient) and finds (contemporary). From a more theoretical point of view, processual and behavioural archaeology can provide a good framework, if for no other reason that they traditionally focused on ‘how’. Yet, by the mid 1990s, the theoretical and methodological debate about formation processes (both focusing on deposits as a whole or on artefacts) has, if not stopped, at least vigorously slowed down. The more evident consequence of such a position is that we still heavily draw on theoretical and methodological thought taken largely from the literature of the 1970s to 1990s. This fact should stimulate an in-depth review of the debate, which would surely have positive consequences on the issue of dating as well.

As for why there should have been such a period of substantial inactivity, an important role may have been played by both a general shift in archaeological agendas and by a subtler conviction that the massive help afforded by scientific techniques would by itself have solved post-excision interpretive problems, including problems of dating. The full exploitation of the wide range of techniques now available, in particular within the field of dating (i.e. the powerful Bayesian modelling), can only be achieved if framed and contextualised in a robust and continuously updated and debated theoretical and methodological background, concerning the way in which the archaeological record is formed. In addition to the fact that it would allow us to avoid rough misinterpretations, such a framework is the only way to move securely from the smaller horizons of the field to the possibility of ‘making history’.

Another point that emerges pretty clearly, with few remarkable exceptions, is the deafening silence from Classical Archaeology in the matters of theory and methodology in general, and concerning formation processes in particular. This absence is even more notable because the availability of large bodies of data (with various natures), which typifies Classical Archaeology when compared to other archaeologies (Prehistoric, Early Medieval), should have spurred the discipline on to better and more sophisticated systems in terms of their theoretical management and also to the generation of articulated and specific methods for extracting information from them. Borrowing models from other ‘archaeologies’ cannot be considered sufficient, and it implies the underestimation of the peculiarities inherent in the ancient systemic context studied. The reasons lie in the fact that models, to have some practical impact, cannot be general (not only at least), but must be specific. For instance, studying the impact of waste disposal on assemblage formation processes in the Roman world, only and simply borrowing models from ethnographic literature or from prehistoric case studies, may obviously lead to wrong conclusions. The specific features of Classical Archaeology, particularly in urban sites, should, hopefully, compel the discipline to produce much more independent theoretical and methodological literature.

Fortunately, exceptions exist, and they show how such an approach produces invaluable benefits. This is, for instance, the case with the study of residuals. But it is also the case with some recent developments in Classical studies of material culture, which are devoting more and more attention to the contextualisation of ceramic assemblages and to the ‘systemic life’ of ancient pottery. In this field, the work of J. T. Peña, drawing on both the tradition of Roman material culture studies and on a behavioural theoretical framework, has been pioneering and represents a cornerstone of the recent literature on the issue. The Pompeii Artifact Life History Project and the Palatine East Pottery Project are providing new and interesting inputs in this sense.

While the theoretical and methodological debate proceeded, field archaeology kept on producing fresh data and interpretations through excavations, with their publications sometimes taking into account the indications emerging from the debate (but more often not doing so).
Within the framework of Italian Classical Archaeology, A. Carandini’s excavations and later excavations led by scholars who matured in the same academic environment, have long been a reference point for many. The Villa dell’Auditorium excavations (which in turn stem from the Villa di Settefinestre excavations) represent a good attempt to present a full body of data in an organic way, integrating information drawn from the stratigraphic analysis with information drawn from the study of artefacts. Residuality is allowed for and crucial contexts and materials are presented in some detail, along with some quantitative information. Chronology building is to an extent explicit, and allows for a certain evaluation and discussion, although it is not always clear if all the data is presented. Other excavations involved the very centre of the city of Rome: it is worth citing here, in particular, the excavations on the Palatine slopes, as their publication generated a robust interpretive debate, precisely about the date of some of the evidence that emerged.

This was possible thanks to the main publication (where some materials are discussed by context and not by type) and several other papers, allowing a critical and wide-ranging view of the data collected. Other good examples throughout Italy, although existing, are comparatively rare. Large bodies of data from urban excavations lie unpublished, and, among the published excavations, too many still provide insufficient data to allow for an evaluation of dating (along with many other conclusions). Far too often the main excavation report consists of a brief summary of the site’s history, followed by a long typological list of finds. The key link between deposits and finds (i.e. a contextual approach) is seldom provided, or, at most, can only be traced with difficulty. Presenting a simple list of contexts and embedded materials and, possibly, their dates, would be an objective fairly easy to achieve. A complete Harris matrix (or at least some selected fragments of the matrix) would also be very valuable, but this is a very rare occurrence. Finally, the status of the deposits is rarely discussed, thus the crucial question ‘how did these finds make their way into the deposit?’ remains substantially unanswered; knowing how the chronology was built and the single deposits were dated remains substantially unattainable. Most dates of structures, deposits and whole occupational phases (which are not raw data, but, at most, interpreted data) have simply to be taken for granted (according to a sort of principle of auctoritas), with no actual possibility of re-evaluation.

This aspect of Italian urban archaeology has been already discussed under different lights and a change has been urged. A complete exposition of data would compel us to use them in a clear and probably more concrete way, with great benefits for the quality of the interpretations provided as a whole. This kind of change cannot after all be viewed as utopian, as other European experiences reveal that more integrated publications of stratigraphic and artefactual data from urban excavations, even involving large numbers of contexts, can be achieved. 

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86 Carandini et al. 2006. It has to be stressed that, although the site is now part of the periphery of Rome, the villa was in ancient times part of the suburbium.