THE BARE NECESSITIES? A COMPARATIVE STUDY OF THE MATERIAL EVIDENCE FOR ROMAN MEDICAL PRACTICE IN URBAN DOMESTIC AND ARMY SPHERES

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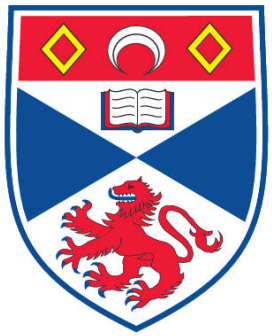

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The Bare Necessities?

A comparative study of the material evidence for Roman medical practice in Urban Domestic and Army spheres.

By Stephanie C. Taylor

Thesis for the degree of MPhil

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Picture Acknowledgements

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Abstract

The study of medicine in the Roman world is, in many areas, hampered by lack of evidence yet, despite this, valuable research has been done in the areas of urban domestic and army medicine. The aim of this thesis is not to reproduce that research but to examine the material evidence for medicine and medical practice used in it, in particular the instruments and buildings where medicine might have been practiced and, through comparison of the data, to see what similarities and differences there were between medicine in the domestic and army spheres. At the same time this data will be placed in context through an examination of the general levels of health in the ancient world and the status of doctors. In the domestic chapter we shall see that the evidence for the status of doctors is sketchy and confusing while the evidence for the health of people is drawn mainly from the skeletons found at Herculaneum. The examination of the instruments from the Naples museum and the provenance of those to which it could be assigned, will shed light on the types of medicine practiced and where doctors might have seen their patients. Throughout this chapter the argument looks forward to the comparison with army medicine in the following chapter. The evidence for health in the army comes mainly from literary sources and that for the status of doctors comes from inscriptions. It appears that doctors had ranks in the army with equivalent levels of pay as the soldiers. While there are fewer finds of instruments from forts, they raise some interesting points. The debate about *valetudinaria* is addressed and I argue that, while they existed, there is evidence to suggest that the buildings identified as *valetudinaria* were not in fact hospitals and that each case must be examined on its own merits. The conclusions are more numerous than might have been expected. There are obvious differences in levels of health between the army and the urban population but there are significant overlaps between doctors in the army and the domestic spheres. The instruments in the two spheres are the same in design with some surprising types turning up. The question of where medicine was practiced remains hazy with the conclusion that in the domestic sphere there is no definite evidence while in the army sphere the buildings identified as *valetudinaria* may not have been hospitals.

1.Introduction

The purpose of writing this thesis is to provide an overview of the evidence for medicine in the domestic and army contexts of the Roman Empire. This involves drawing together two strands of research, that of urban domestic medicine, and that into army medicine, which have not previously been analysed together, but which have received a lot of individual attention. This is due to the tendency to focus on detail, such as the work done by Jackson[1] and Bliquez[2] on instruments and to focus either on domestic or army contexts. As a result, there has been excellent research in both areas and my intention is to tap into both of these research areas, drawing them together in this thesis. Thus, I will create a synthesis which contributes to the wider understanding of Roman Medicine.

The aims of this research are as follows. To place the material evidence for the practice of medicine in the roman world into the wider context of health, diet, doctors and the need for medicine. As part of this, to address the question of where medicine might have been practiced. To compare and contrast, as far as possible, the evidence for medical practice in these two areas of Roman life, stressing both similarities and differences in order to gain a nuanced overall picture.

The scope of this comparison is urban domestic and military medicine in the Roman Empire, in particular between the first and third centuries AD. This is because there is the most extant material evidence for these areas from this period. The focus in the domestic chapter is specifically on urban domestic

[1] e.g. Jackson (1986) (1991) (2002) (2005).
[2] e.g. Bliquez (1994).

medicine since this is the area for which we have the most evidence. This comes primarily from the Vesuvian towns, Pompeii and Herculaneum and, more recently, from the excavations at Rimini in North-Eastern Italy. The dates for these sites are secure since it is known that Vesuvius erupted in AD 79 and covered Pompeii and Herculaneum at that time, while the *Domus* 'del chirurgo' in Rimini burnt down during a raid by the Alamanni in AD 257-258. It was then back-filled in order to strengthen the town wall against which it was built, thus preserving the instruments inside. In the army chapter the forts and fortresses examined cover a similar period of time as this, again, is the period for which we have the most information. The reason for This is that during the early Principate the Empire was expanding rapidly and forts were put in place along the frontiers only to be abandoned later when the frontier moved further out or shrank under pressure from the 'barbarians'.[3] This gives us a sufficiently wide time-frame that we can see any changes in instrumentation which might have occurred, along with what has stayed the same, across nearly two centuries of medicine and medical practice in the Roman Empire.

It could be suggested that extra material from sites such as Epidavros be included. However, because this is a comparison between urban domestic and military medical practice through the evidence for them, the inclusion of such material would, I feel, complicate, unnecessarily, this study.

Choosing the period with the largest amount of data available for study is important if headway is to be made in this particular area. The one major discrepancy between the domestic and the army contexts is that the examples used for the domestic context are from within Italy while the examples from the

[3] Baker (2004) 21-22.

army are from some of the furthest corners of the Empire, from Wallsend in Britain and Novae on the Danube. This is unfortunate but also unavoidable since these are the sites for which we have the most recent data. As a result, the drawing of conclusions must be done cautiously and with an awareness of the geographical difference of these sites. However, despite the discrepancies of time and place it may be seen that in some respects medicine was the same wherever it was being practised and certainly one thing remained constant, the diseases are likely have been similar right across the Empire: conjunctivitis is the same whether in a city *insula* or an army barrack.

The wide scope of this thesis does present a number of problems when trying to compare evidence from such a diverse range of places, times, and contexts. The areas used are dictated by the distribution of the evidence and are not ideal. The most we can do is to compare the evidence we have while remaining aware that we are not necessarily comparing like with like. The evidence will be examined under the broad headings laid out below in order to try and work around this. However, there will always be problems with this approach and the evidence, meaning that any comparative conclusions drawn from it have to be approached with suitable caution and awareness of the discrepancies of time and place. The discrepancy of contexts for the finds is not such a problem since it is this very difference which is at the heart of this thesis. Examining where the finds from these contexts overlap and where the differ is an essential part of this thesis.

The nature of the evidence itself can cause problems since the evidence for the army is mainly epigraphic and literary while that for the urban domestic is archaeological and mortuary, in particular from the Vesuvian towns. Here it

is important to remember that the former is an ideal which may or may not have been the reality while the latter provides us with a snapshot of the reality of life and health in two towns on the Bay of Naples at a specific point in time. Therefore, the comparisons drawn must be done so cautiously, with this in mind.

Additionally, the survival of evidence is a problem. The recording of the evidence from the Vesuvian towns has not always been as good as modern scholars might like, while the way in which the army cleared sites which they were abandoning, effectively controlled what was left and, therefore, what we are likely to find.[4] This means that it may be impossible to reach clear conclusions in some areas. However, even though this may be the case, my aim here is to show that it is important to examine the evidence we have and to test it systematically.

Each chapter will follow the pattern laid out below. It will start with a general overview of the area of study using a wide range of sources and looking, in particular, at the provision of care and the evidence for the activity and status of doctors in both spheres. This will be followed by a more detailed comparison of the material evidence in the form of instruments and buildings. In this way the particulars of the material evidence will be set against the general picture of Roman medicine in each of the spheres, allowing it to be viewed in context rather than in isolation.

There is important work in the area of ancient medicine already and it is not my intention to supersede it since it has made it possible for me to do this

[4] Bishop & Coulston (1993) 34.

study. Bliquez's catalogue[5] of the surgical instruments in the museum at Naples is invaluable for anyone attempting a survey of this kind as are Jackson's articles, in particular his 1995 paper which sets out the basic instruments for a doctor's kit.[6] Künzl's 2005 article provides important insights into the debate about hospitals in Roman fort,[7] as does Baker's book on medical care for the Roman army.[8] All these authors have done very close work on the instruments with which medicine was practised. Others have used more text-based approaches, making important progress in the study of Roman medicine from that perspective.[9] These two strands are brought together by Nutton in his book *Ancient Medicine*,[10] among others, including Scarborough[11] and Cruse[12] The intention here is to take these very different, yet detailed, bodies of scholarship and integrate them into the bigger picture of medicine in the first three centuries AD. That has been done before, of course, not least by Nutton himself, but my aim is to bring a new dimension to the exercise of surveying the broad environment of medicine in the Principate through a specific focus on comparative questions.

Baker does place medicine in the army into the wider picture of medicine in the Roman Empire, including an examination of the medical practices of the auxiliary troops.[13] She not only examines instruments but also fuels the debate as to whether army hospitals *(valetudinaria)* existed or are a construct of modern archaeology and archaeologists looking to equate the

[5] Bliquez (1994)
[6] Jackson (1995).
[7] Künzl (2005).
[8] Baker (2004).
[9] e.g. Singer (1997).
[10] Nutton (2004)
[11] Scarborough (1969).
[12] Cruse (2004).
[13] Baker (2004) 49-51

physical remains with the ancient texts. Implicit in that argument is a question about how army and domestic medical practices compare. Her book on the medical care for the army on the frontiers of the Empire[14] has been invaluable to me in this study because she has drawn together the data on how many and what kinds of instruments have been found in frontier forts and she appears to be driving the debate on whether there were hospitals in Roman forts. However, I will be drawing some slightly different, more cautious, conclusions from the evidence she presents than those which she came to, as we shall see in both the Instrument and *Valetudinarium* sections in Chapter 3.[15]

As a result of these different conclusions I will re-evaluate some of the material evidence and what can be learnt from it and its context. I hope to advance our understanding of the relationship between material evidence for medical activity and its context. This will be done in the light of new finds from Rimini and the auxiliary fortat Wallsend and the Legionary fortress at Novae as well as the older excavations at Pompeii, Herculaneum, Housesteads and Neuss. This is important since, for the finds from earlier excavations, we have very little in the way of provenance and, unfortunately for the discussion about where medicine might have been practised in the domestic sphere, we do not know where exactly they were found. This is a problem which Allison addresses in her analysis of the material culture in Pompeii.[16] In it she is essentially trying to place the finds back into the contexts in which they were found and, from that, determine what the room use might have been in 30 houses in Pompeii. The importance of this can be seen when the fame of the House of the Surgeon is

[14] Baker (2004).
[15] See p.105 & 116.
[16] Allison (2005).

examined. This fame appears to have come about through the assigning of various instruments to the house, although they did not come from it.[17]

In addition, I will re-evaluate the question of how items came to be left in forts and fortresses when, as mentioned above, the army was so conscientious about clearing a site so that there was nothing left that the local 'barbarians' could use.[18] I will also examine the various arguments which have been put forward by way of explanation of the finds and how they came to be left in particular places, for example, the Corbridge Hoard.[19]

There have been a number of recent developments in the research into ancient medicine with an increased interest in the subject and research being carried out in numerous areas as diverse as women in medicine[20] and what a specific instrument might be which is described in Celsus' *De Medicina.*[21] There is also an increasing interest in the cultural and social context in which medicine was practised and how this might have affected the practice of medicine.[22] In the past the focus was very much on Greece and the philosophy of ancient medicine, with Rome being seen as poorer in its medical traditions, and many books on Roman medicine start with a chapter on Greek medicine.[23] That has begun to shift now and Roman medicine is coming under increasing scrutiny in its own right,[24] particularly with the discovery of the Rimini *instrumentarium*.[25] In the past the material evidence for ancient medicine has

[17] Bliquez (1994) 80 and Künzl (1999) 583.
[18] Bishop & Coulston (1993) 34.
[19] Allason-Jones& Bishop (1988).
[20] King (1998).
[21] Jackson (1991).
[22] Pleket (1995) 27-34.
[23] e.g. Jackson (1988) and Cruse (2004).
[24] e.g. Nutton (2004) at least half this book is devoted to Roman medicine & Cruse (2004).
[25] Jackson (2003).

been interpreted through texts alone and not through its context as well.[26] Importantly, Baker does interpret the evidence through its context in her argument about *valetudinaria* in forts, and it is what I intend to do with the material evidence which I will be presenting in this thesis. While the texts guide us in what an instrument might have been used for there is little mention of where medicine was practiced.[27] The context in which that instrument was found might give us clues as to where medicine may have been practiced in a particular sphere. For most of the instruments from the Vesuvian towns this analysis is not possible since we do not know where they were found. However, with the instruments from Rimini we know where they were found and how they were lying in relation to each other and the room they were in. In the case of the instruments from forts and fortresses, it is important to note, as Baker points out, that, in many cases, there were instruments outside the building identified as the *valetudinarium* which need to be taken into account when assessing where medicine might have been practiced in any particular site.[28] Here I intend to follow her reintegration of these instruments into the assessment of medical practice in these forts and examine further what could be said about the practice of medicine in forts in general from those which have been examined in more detail.

In summary, this thesis is, above all, a project of comparison. It aims to make an original contribution by bringing together groups of material which have not, for the best part, been studied together: military and urban domestic; material

[26] Allison (2005) 5&11.
[27] Celsus VII 7.14.C.
[28] Baker (2002) & Baker (2004).

and textual. In the process it also aims to shed new light on specific pieces of evidence and on specific debates within recent scholarship.

2. Domestic Medicine

Introduction

Pompeii is the obvious place to find material evidence for the practice of medicine in a domestic context. The eruption of Vesuvius in AD 79 means that we have a large collection of finds from the Bay of Naples with which to work. However, these finds are not, as we shall see, unproblematic.

In this chapter I am going to look at the evidence for the practice of Roman medicine in the domestic context from three different angles. Firstly, I will make a survey of what the health of the population might have been in order to place the practice of medicine into context. Secondly, I will briefly examine the literary and epigraphical evidence for the practice of medicine and what these can tell us about who the doctors were and what their status might have been. Thirdly, I will examine the instruments which have been found in the Vesuvian towns and Rimini and what we can learn from them about the medicine which was being practised. For example, what kind of procedures are likely to have been carried out. Finally, I will address the question of where medicine might have been practised in Roman towns in general and in Pompeii in particular. Throughout I will be looking forwards to the comparison with the army.

Provenance

The main problem is the lack of provenance for the instruments which leaves us unable to identify specific rooms in specific houses as having been associated with the practice of medicine. Therefore, I shall also examine the evidence from the *Domus* 'del chirurgo' in Rimini *(Ariminium)* on the Adriatic

coast, as far as it has been published.[29] This latter is the largest single find of instruments from the Roman world and is significant because the instruments, unlike those from Pompeii have secure and exact provenance and were excavated according to modern archaeological practice. In addition, because of the way in which they were sealed by a fire in the house, there is very little possibility that any of the metal instruments are missing. In Pompeii it is more than likely that people took at least some instruments with them as they fled the town.

Bias in excavation and display of artefacts

However, before starting to look at these areas it is important to understand the specific issues which arise out of the excavation of Pompeii. Pompeii, as Alison Cooley has pointed out, suffers not only from the way in which it was excavated but also from the way in which it has been managed.[30] The sometimes extreme shifts in the politics of the region have had a major impact on the way it was excavated and on the way in which the finds were treated.[31] Among the contemporary critics of the excavation Scipione Maffei criticised the throwing away of the less impressive objects.[32] In addition, while specific areas might be excavated for the benefit of a visiting dignitary, the less distinguished tourist could buy small finds as mementos of their visit.[33] The finest finds from both Pompeii and Herculaneum were displayed in the 'Museo Ercolanese' in the Portici Palace but only to a privileged few and even they

[29] Jackson (2003) 312-321
[30] Cooley (2003) 80-96.
[31] Cooley (2003) 11, 13-14.
[32] Cooley (2003) 69.
[33] Cooley (2003) 76.

were not allowed to sketch the objects. The displays in the museum were thematic and, thus, the finds from the two cities were mixed together with no record of their original provenance.[34] Practices such as these in the handling and recording of the finds are what every researcher examining material from Pompeii encounters. While we may deplore the way in which the site was excavated it has to be remembered that the original object of the excavation was to find art which would put Naples and the Bourbon Kings on a par with the other great cultural centres of Europe.[35] While the approaches to the excavation of Pompeii and the treatment of the artefacts found there changed over time as a result of different heads of excavation and different political regimes, the problems outlined above have had a far-reaching impact on the study of Pompeii and its artefacts.[36]

In the study of the medical artefacts from Pompeii the impact of the way in which Pompeii was excavated cannot be ignored. How many more instruments were discarded or have ended up in private collections it is impossible to guess. Therefore, the examination of the evidence is undertaken with the understanding that the evidence available is incomplete and that any conclusions drawn from it are, by implication, incomplete and open to change or being rendered void by new evidence which may appear.

Health and nutrition in the ancient city.

The aim of this section of this chapter is not to cover every aspect of health and nutrition in the urban domestic environment, but rather to make a brief survey of what the levels of health and nutrition might have been in the

[34] Cooley (2003) 70-71.
[35] ibid 66-68.
[36] ibid 13-14.

urban domestic environment as these have a direct impact on how often a person might have needed the attention of a doctor, although whether they would actually have been able to afford such attention is a different matter altogether. This will be done through the examination of the skeletal evidence from Herculaneum and Pompeii along with a discussion of what their diet may have consisted of and how their lifestyle may have affected their life expectancy. Since the army was made up solely of men the examination of the health of the populations of urban domestic areas will, necessarily, focus on men since. This will be contrasted briefly in the following chapter with the evidence for the health of the army, as the health of the people in both contexts will have had a major impact on the requirement for doctors and medicine. The best evidence for the health of an ancient population is to be found in their skeletons. Thus, for this section I will be examining the evidence for this in those skeletons found on the seafront of Herculaneum, in total 139 people,[37] along with those from the house of C. Iulius Polybius in Pompeii[38] and using the data in Henneberg and Henneberg's 2002 paper on the skeletons from Pompeii.[39] Ideally, with the majority of the instruments from the Vesuvian towns coming from Pompeii, only skeletons from Pompeii would be examined but his is not possible. The study of the skeletons from Pompeii has only recently begun and, as with the other evidence, the way in which they were excavated and subsequently stored leaves much to be desired. Remains of only half the estimated number of individuals excavated have survived.[40] Roughly 650 people were found in the layer of ash from the surge stage of the eruption

[37] Bisel & Bisel (2003) 451-475.
[38] Henneberg & Henneberg (1996) 249-259.
[39] Henneberg & Henneberg (2002)169-187.
[40] ibid 169.

while 394 were found in the pumice layer from the earlier stage of the eruption in Pompeii.[41] The data from Herculaneum provides, at the present time, more detailed analysis of the individuals than Henneberg and Henneberg's 2002 paper can.

It is important when looking at the evidence from Herculaneum and attempting to draw a parallel with Pompeii to remember that there are significant differences in the placement of these two towns which could have had aan impact on the relative health of the populations.[42] In addition, conclusions cannot be drawn from these skeletons about the normal life span of ancient Romans in the first century AD since they all died prematurely in the eruption of Vesuvius.[43] However, the skeletons from Herculaneum provide a unique snapshot of the lives and health of some people in ancient Roman towns. They did not die of old age or disease but were ordinary people, some of whom were living with disease, malnutrition and dental problems ranging from decay to abscesses. Their skeletons can tell us something about the quality of life they may have had as individuals.

As a starting point it is worth examining what can be learnt from the teeth of these people. Teeth are the most enduring part of a skeleton after death. In fact, they can often be the only thing that remains to be excavated. They provide a wealth of information about the diet, oral hygiene, stress and occupation of a person, to name just a few areas.[44] One of the most striking things about the teeth of the people from Herculaneum is that most of them have an edge to edge bite. The overbite and overcrowding which are so common in

[41] Cooley (2003) 45.
[42] Laurence (2005) 87-88.
[43] Bisel& Bisel (2002) 451.
[44] Roberts & Manchester (2005) 63.

modern populations are rare among the skeletons found. Bisel and Bisel suggest that this was due to the longer period of nursing, up to three years of age, in ancient times, and the greater exercise in chewing food when eating without knives and forks.[45] Both of these factors stimulate jaw growth to a greater degree than happens in modern society. There was also a very low level of decay in the teeth. This can be attributed to two things. Firstly, there would have been no sugar in their diet as it had not yet been discovered, the main sweetener was honey but this was expensive. This is a factor which we shall also see with the army. Secondly, the greater consumption of more abrasive food, such as coarse bread, by the majority of the population would have scoured the teeth as it was chewed. Slight periodontal disease (which results in bleeding gums) was widespread, especially in the older part of the population and is visible as pitting of the bone around the teeth,[46] while about half of the population had enamel hypoplasia.[47] This results in horizontal lines in the enamel which are caused by periods during which a child is unable to assimilate sufficient calcium to form enamel. They thus remain as a permanent record of illness, or even malnutrition, of two weeks or longer while the teeth were forming.[48] We will see below that lines of enamel hypoplasia on teeth cannot be taken as evidence of social status.[49] This is because access to a wider range of higher quality foodstuffs would not have protected the rich from the diseases which could at worst kill and at least affect growth.[50]

[45] Bisel & Bisel (2002) 455.
[46] Roberts & Manchester (2005) 73.
[47] Bisel & Bisel (2002) 455.
[48] Roberts & Manchester (2005) 75.
[49] See p.16.
[50] See p.17ff.

The evidence of enamel hypoplasia points to childhood diseases being common in Herculaneum.[51] Strikingly while 80% of the recovered population of Pompeii had enamel hypoplasia only 50% of the recovered population of Herculaneum did.[52] This points to differing levels of health in towns which were not very far apart. This could be explained by the different locations of these two cities. Herculaneum was on a site associated with good air while Pompeii was close to a major river with its associated marshlands.[53] However, this is not as bad as it sounds since Pompeii was on raised ground above the river. The Romans themselves knew the dangers associated with marshes. There are numerous examples of writers dictating where cities should be placed scattered throughout Roman literature.[54] Vitruvius, among others, writes on the correct site for a city,

> These should be the primary elements for constructing the walls themselves: first of all the choice of a very healthful site. It should be elevated, not cloudy, not liable to frost, facing those regions of the sky which are neither hot nor cold but temperate. In addition, if at all possible, proximity to swamps is to be avoided. For when the morning breezes enter the town with the rising sun, whatever mists have formed overnight are joined with them. Their gusts spew the poisonous exhalations of the swamp animals, which have been mixed in with the mist, at the bodies of the inhabitants and these will make the place pestilent.[55]

Laurence hypothesises that the presence or virulence of malaria at Pompeii could account for the higher levels of enamel hypoplasia found there as compared to Herculaneum.[56] The lower number of cases of malaria, or its absence, in Herculaneum would also have led to a lower incidence of childhood respiratory illnesses.[57] Laurence further suggests that the high level of tuberculosis-type diseases in the adult population might have been due to the

[51] Bisel & Bisel (2002) 455.
[52] Laurence (2005) 86.
[53] ibid 88.
[54] Borca (2000) 74-83.
[55] Vitruvius I 4.1.
[56] Laurence (2005) 87-88
[57] ibid 87-88.

presence of malaria, since the interaction of malaria and respiratory illness might produce a higher level of disease and death via pneumonia.[58] This argument does still work even though Pompeii is further from the marshes than Laurence implies since it is possible that people went down to the river.

One very interesting discovery by Henneberg and Henneberg is the presence of bone changes in particular, in the bones of the skull and tibia which lead them to the conclusion that there might have been venereal syphilis in the population.[59] However, those with malaria, which might have been endemic in the population, would not develop syphilis since the bacteria, *treponema pallidum*, which causes it is unable to survive the high temperatures created by malaria. Henneberg and Henneberg[60] hope to have more conclusive evidence in the future but for now the possible presence of syphilis adds another dimension to our discussion of the health of the population.

In their analysis of the skeletons from Herculaneum, Bisel and Bisel[61] look at the growth curves for the children from Herculaneum. Perhaps the most important conclusion they draw from this data is that if a child, especially a male child, suffered a serious disease or malnutrition during the growth spurt, then the growth would be severely compromised.[62] Unfortunately, their chosen comparison group is, throughout the paper, the modern American population. While this is an obvious choice, since the data is readily available, it is not the most logical. The logical choice would be, as Laurence has pointed out, other

[58] Laurence (2005) 87.
[59] Henneberg & Henneberg (2002) 176.
[60] ibid 169-187.
[61] Bisel & Bisel (2002) 456.
[62] Bisel & Bisel (2002) 456.

modern populations from non-Western societies.[63] Modern America, along with the other modern Western societies, is completely different to Pompeii and Herculaneum in AD 79 not only in diet but also in lifestyle and healthcare.

Interestingly, the modern preconception that ancient people were shorter than modern populations is incorrect.[64] Potential height is determined by a person's genes but they can only attain that height given ideal environmental factors and nutrition during childhood and adolescence. Excessive work demands on the body during this period can also affect growth by depriving the body of nutrients.[65] At Herculaneum in AD 79 the average height for men was 169cm (5ft.6in.) and for women was 155cm (5ft.1in.). This makes them taller than the inhabitants of modern Naples who are, on average, 164cm (5ft.4in.) and 153cm. (5ft.0in.) respectively.[66] In Pompeii the average height for men was 166cm (5ft.4in.) and women 154cm (5ft.0in.), the same as modern Naples. These averages have, of course, been complied from the available data which may not be an accurate representation of the population of Pompeii, Herculaneum and the ancient world in general. However, they are the best we have at the moment, and, as such, give us some indication of the possible levels of nutrition in the population since those who have a diet lacking in important nutrients as children do not grow as tall as they might otherwise. These general figures for the height of the population imply that the average resident of Herculaneum either ate better as a child than the average resident of Pompeii or suffered from less disease as a child. However, as we shall see, the individual

[63] Laurence (2004) 85.
[64] Roberts & Manchester (2005) 41.
[65] ibid 39.
[66] Bisel & Bisel (2002) 455.

skeletons each tell their own story and the detail must not be ignored when building up a picture of the health of the population.

As we have seen, the growth of children, and general health of the population was very much dependent on the amount and quality of the food which they were eating, but what exactly were they eating and what was the difference between the diet of those who could afford to eat well and those who could not? Once again, some of the answers to these questions can be found in the bones of the people, as well as in the literary sources. Bisel and Bisel's analysis of the mineral content of the bones has led to the conclusion that the Herculanean diet was high in seafood and vegetable protein and low in red meat.[67] As we shall see, this lack of red meat in their diet is not very different from the diet of the army[68] but, while the army provided a basic level of nutrition, the poorest members of urban society had no such guarantee and their health would have suffered as a direct result. This high intake of seafood had a beneficial side-effect. Seafood is high in fluoride and, therefore, helped to protect teeth from decay, an effect which can clearly be seen in the population.[69] However, there was a disadvantage to this diet too. It was low in iron and, therefore, could cause a slight to moderate anaemia, which would itself predispose the population to frequent infectious diseases. This accounts for the frequency of hypoplasic lines in the teeth of the population.[70] Healed anaemia can be detected in the skull as porotic hyperostosis, a swelling or thickening of the inner diploe (interior) of the parietal bones (the main bones of the skull across the top of the head). There was a relatively high incidence of this in

[67] Bisel & Bisel (2002) 456-459.
[68] See p.83ff.
[69] Bisel & Bisel (2002) 258.
[70] ibid 455.

Herculaneum.[71] Bisel and Bisel hypothesise that this could be due to two causes: an inadequate intake of iron and/or as a result of heterozygotic thalassaemia (a type of hereditary anaemia) which comes about as a response to the exposure of many generations to malaria.[72] We have seen above that malaria might have been a problem for the inhabitants of both towns but in particular those of Pompeii.[73]

The staple diet of the poor was cereal, usually barley or wheat, which would most likely have been made into porridge as this was less time and labour intensive than making bread, although they would have had recourse to legumes as a major component of their diet. [74] This had its own problems as low-grade flour has a high phytate content which impedes the absorption of vital minerals, such as iron and calcium, leading to iron-deficiency anaemia.[75] Garnsey puts forward the idea that cereals would have formed 70-75% of the total consumption of the poor but highlights that, no matter how plausible this is, it is only a conjecture.[76] If we take Garnsey's hypothesis to be correct this means that the poor would have had a high intake of phytate-rich food leading, inevitably, to a high level of anaemia in the population.

The wealthy minority were more likely to have access to a wider variety of foodstuffs than the poor but may not have had a better diet because of poor choice from the foods available.[77] Higher levels of nutrition, such as those found in the army which will be examined later, would not have protected them

[71] Bisel & Bisel (2002) 458.
[72] ibid (2002) 458 and Sallares (2002) 143.
[73] See p.16-17.
[74] Garnsey (1999) 121-122.
[75] ibid 20.
[76] ibid 19.
[77] The same can be seen in modern society where those with the most choice often do not have the most balanced diet.

from disease. This can clearly be seen in the teeth of the skeletons found in the House of Julius Polybius in Pompeii. That they all had an adequate diet has been established by examination of the levels of zinc, strontium and calcium in the bones. However, of the nine individuals, all, bar one, had suffered from periods of acute illness or malnutrition. Laurence states that it is significant that the two female adults from the house suffered periods of acute illness as young adults, whereas the two male adults only suffered acute illness as children. Unfortunately, he does not expand on why he thinks this is significant.[78] There are two possible explanations for this. The first is that while the men were in Herculaneum during their early adult life the women only moved to Herculaneum when they were older. This is the most likely reason for the significance since the evidence in the house points to the men at least being descended from imperial freedmen.[79] When the women arrived they are likely to have picked up the infections to which the locals had acquired immunity but caused the newcomers to suffer a more serious bout of illness. The second possibility is that boys were exposed to disease earlier on in life than girls through being sent outside the home for schooling, and girls only moved from their fathers', or owners', houses to another family when married and, thus, were exposed to new strains of disease slightly later in life.

When compared to the Roman army it can be seen that, since this is a much wider spectrum of people, the attendant health problems are far more varied. Poor diet was not, as we shall see, a problem in the Roman army[80] whereas, for many in the Roman Empire, it was a fact of life. In addition, those

[78] Laurence (2005) 86.
[79] ibid 91.
[80] See p.83ff.

health issues which relate only to women are not found in strictly army settings, although in the civilian settlements attached to Roman forts it will have been an issue, perhaps even one for which the camp doctor was called in.

The examination of the skeletons found in Pompeii and Herculaneum raises a number of interesting points. Garnsey states that while the data from the skeletons is useful for nutritional status and health, as seen above, it does not show the differences in social class.[81] Bisel and Bisel have shown that the amount of hard physical work that a person did shows clearly on the skeletons and use this data to define whether they came from the "privileged class" or were "typical Herculaneans".[82] This could be seen to be supporting the argument for status being determinable from skeletons, but it must be noted that they are not claiming to determine the status of these people. They are merely using the evidence to place these people into one of two very general groups which are wealth-based and not status-based. However, in so doing they are still making assumptions about these people which need more support. They do not take into account that there may have been rich freedmen of low status who might have had all the signs of being well-fed and not having over-worked but they would not have of high status. It is almost impossible to define a "typical Herculanean" from our modern standpoint. At best what can be said is that there were people who ate well and those who did not. Thus we can see that status of any kind cannot be determined from bones, merely levels of nutrition and hard physical work can be deduced.

Roberts and Manchester state that, some health indicators, such as enamel hypoplasia, have been found to have no relevance to status, as is the

[81] Garnsey (1999) 115.
[82] Bisel & Bisel (2002) 460-473.

case with enamel hypoplasia because disease is indiscriminate.[83] However, those indicators, such as trauma and bone surface inflammation, which show activity, in particular excess activity such as that undertaken by some slaves, seem to be related to social status when looked at in conjunction with grave goods from iron age burials.[84] However, this is anachronistic as it works on the modern concept that a person's status is defined solely by their wealth. As Jongman points out, Roman society had a complex social system which meant that no matter how rich a freedman was he could not reach high social standing.[85] A wealthy freedman could have evidence of both hard work and of being overweight on his skeleton but the fact that at some point he had enough wealth and leisure to be overweight does not mean that he was of high status. This is, however, not a clear-cut issue. There are other problematic groups including, but not exclusively, favoured domestic slaves who ate well and had access to good healthcare[86] and centurions who were wealthy but worked hard.[87] The two extremes are as follows; a person from the lower levels of society, for example a slave or someone who worked the land, was more likely to do hard physical work, which would have caused the muscle attachments to the bone to become enlarged. In addition, they were more likely, due to the nature of the work they were doing, to suffer fractures. These might not be properly set, particularly if they were unable to afford the attention of a doctor and would, therefore, still be visible on the skeleton. Even if that person later became rich and ate well, the damage done to the skeleton by the hard work in earlier life would remain. Those who have an insufficient diet and also work

[83] Roberts & Manchester (2005) 42
[84] ibid 42.
[85] Jongman (1988) 208.
[86] See Horstmanshoff (1995) 85 for an example of a slave being visited by Galen.
[87] Woolf, .G. in conversation.

hard have flatter bones, because their bones, due to the lack of nourishment, are too small to take the enlarged muscle attachments which result from hard labour. Therefore, the bones flatten in order to create enough surface area for the attachments.[88]

Erc27[89] is an example of this. He was about 46 years old but was short (163.5cm or 5ft.4in.), had spindly and flattened bones and a rather flattened pelvis. His muscle attachments, which show some pulling, show that he spent his life in hard labour. Seven of his thoracic (chest) vertebrae are fused on one side with a continuous band of ossification. Bisel and Bisel come to the conclusion that this is the result of Forestier's disease.[90] While this would have been painful[91] it would not have prevented him from working hard all his life despite causing slight scoliosis (curvature of the spine) to the right and the loss of the normal curve of the back. His teeth were, however, the most painful aspect of his life. He had lost seven teeth ante-mortem and had four caries (decay) and four abscesses in the remaining ones. One of these latter was so large that it drained into the maxillary sinus (below the eye). This appears to have caused him so much discomfort that he chewed on the other side of his mouth, even though there were no teeth there. This shows in the excessive amount of calculus on the teeth of the side of his mouth that he was not using.[92] We can see from his skeleton that this man suffered from an insufficient diet,

[88] Bisel & Bisel (2002) 455.
[89] The skeletons from Herculaneum each have a number which is preceded by 'Erc' for Ercolano, designating where they were found.
[90] The cause of Forestier's disease is unknown but it is characterised by gradual and complete fusion of the spine which looks like candlewax. This is surprising as Roberts and Manchester, (2005) 159-161, state that it is associated with obesity and Type 2 diabetes, conditions more usually associated with the wealthy who do not have to work so it seems unlikely that these are the causes here. However, it could also be the result of an exaggerated response to a stimulus which would cause most people only to lay down a small amount of new bone and this seems more likely in this case.
[91] Roberts & Manchester (2005) 160.
[92] Bisel & Bisel (2002) 468-469.

worked hard, harder than he could without excessive exertion, and had incredibly bad teeth.

At the other end of the spectrum is the man who has always eaten well, may have had some spells of childhood illness but has well-rounded bones, is well-muscled but has never over-worked his muscles to the point of pulling the attachments to the bone.

Erc86 was male, about 46 years old, tall for the population (172.4cm or 5ft.8in.) and had relatively round bones, which were also thick and heavy, showing that he was well-nourished. He had large, well-developed muscles but these are from athletics and not from hard work since he had never overworked them. This is determined because athletes work on all the muscles while those doing hard physical labour develop only the ones they are using for the job and tend to over-work them which pulls the attachments to the bone. The development of the muscles of this man's right shoulder and arm implies that he was he was right-handed and used the right arm for some activity needing strong exertion. Bisel and Bisel suggest that he may have participated particularly in sports such as hurling the discus, weights or javelin, as well as others which developed more general muscles.[93] Interestingly, the lack of development of the muscles in his hands shows that he only used them moderately and Bisel and Bisel speculate that he probably had someone else to do his writing for him. Thus, we get a picture of a man who was well nourished, exercised frequently, was right-handed and who probably didn't write, although he may have been able to.[94] These two extremes can be

[93] ibid 461.
[94] Bisel & Bisel (2002) 460-461.

compared to Erc26 who, as we shall see later[95] was a soldier, had suffered some injuries but was well muscled with evidence of having spent a lot of time in the saddle, which shows in the large muscle attachments on both his knees,but who was well fed.[96]

These two extremes are found along with examples of those who fell between them; those who worked hard but ate well. Erc28 was a 16 year-old male who was quite tall (173cm or 5ft.8in.) for the population. At the time that Bisel and Bisel's chapter[97] went to print only the upper half of his body had been excavated. This showed that he had very well-developed muscles with the crests of the muscle and ligament insertions in some cases not only being extremely large but also having signs of pulling and stress. In addition there are Schmorl's herniations on the bodies of all the lumbar vertebrae (lower back) and on some of the thoracic vertebrae (upper back). These are symptomatic of the degeneration of the intervertebral discs and occur where the disc contents are exerting pressure on the surfaces of the vertebrae.[98] These imply that he was doing hard physical labour and similar development of the upper body is to be seen in modern fishermen, in particular those who are older and once rowed their own boats. His teeth are healthy with no lesions or hypoplastic lines and his wisdom teeth have not yet erupted. However, both his upper right incisors are very worn while the left ones are not. This must, according to Bisel and Bisel, be from some industrial use of the teeth. Modern fishermen use their teeth to hold the bobbin of cord used to repair nets and this would account for

[95] See p.96
[96] Bisel & Bisel (2002) 468.
[97] ibid 451-474
[98] Roberts & Manchester (2005) 140-141.

this wear.[99] It seems, therefore, that he was a young fisherman who had been working as such for a significant period of time. He was, however, well-nourished, probably as a result of his job, with no flattening of his long bones and had suffered no significant periods of illness while young. These various levels of health in the population will be compared with that in the army in Chapter 3.[100]

In these three men we see three very different pictures of Herculanean society. There were those who ate well and exercised for fun. There were those who ate well but worked hard for a living which left its mark on their teeth and bones and, finally, there were those who did not eat well, were overworked physically and have any treatment for their teeth. There were, of course people who were between these three examples, but these three men give some idea of the great variety of prosperity in ancient Herculaneum and the range of health problems which might have been common.

As we can see from the above discussion, the general health of the populations of Pompeii and Herculaneum would have been varied with malaria being endemic alongside tuberculosis. It seems that syphilis might also have been present in the adult population.[101] While disease was undoubtedly a feature of life in Herculaneum and Pompeii, the times at which the physician was most likely to use the instruments outlined below was when bones were broken or during childbirth, although we should not forget that bleeding was relatively common practice in the ancient world.[102]

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[99] Bisel & Bisel (2002) 467.
[100] See p.83ff.
[101] Laurence (2005) 87 and Henneberg & Henneberg (2002) 176.
[102] Nutton (2004) 93.

In Herculaneum two pregnant women were found. Both were about seven months pregnant with their first child. The first one, Erc52, was twenty-four with well rounded bones indicating good nutrition and that she do hard physical work. Her teeth are good and show no signs of serious childhood illness.[103] The second, Erc110, was about sixteen years old with some hypoplastic lines indicating serious childhood illnesses or malnutrition. While she had not done hard work, her teeth and the slightly flattened bones of her pelvis indicate that she did not have as good a diet as the first woman. Obviously pregnancy should not have been an issue in the Roman army but it is possible that the army doctors found themselves dealing with births in the towns which grew up near the Roman forts. If the instrument found in the fort at Mainz is actually an embryo hook, and this is very doubtful, its use would not have been in the fort.[104] Interestingly, the number of births in Herculaneum appears to be low indicating that some form of birth control was being used.[105] This was most likely to be obtained from the doctor and Soranus lists a large variety of ways of preventing conception and, indeed, some interesting ideas on how to cause an abortion. The contraceptives suggested include old olive oil, honey and cedar resin. [106]

Two of the case studies by Bisel and Bisel show how the attention of a physician could make a big difference to how much an injury affected the use of a limb after healing. Erc62 was a man of about 51 years who had average flatness of the long bones, average roundness of the pelvis and lost only two teeth before death. He had worked hard which shows in the enlarged muscle

[103] Bisel & Bisel (2002) 465.
[104] Baker (2004) 64.
[105] Bisel & Bisel (2002) 453-454.
[106] Soranus I xix.

markings on the bones. However, he also had very arthritic knees, to the point of ulcers forming, which must have caused him considerable discomfort. Bisel and Bisel speculate that this was due to degenerative osteoarthritis, which may have been aggravated by obesity. This would have contributed to joint damage in his knees and allowed the arthritis to develop.[107] Obesity would argue that he had enough money to live comfortably and eat more than he needed to, while the good condition of his teeth leads to the conclusion that he did not have an especially sweet diet. He had, however, worked physically hard and had sustained a fracture of both the bones of the right forearm, probably by parrying a heavy blow or falling object.[108] The ends of both shafts overrode slightly by about 9 to 10mm. and the rotation of the forearm would have been impaired, due to bony outgrowths which developed during healing, meaning that the ulna only rotated 80 degrees around the radius and that the forearm could not flex past 90 degrees.[109] Bisel and Bisel suggest that he had some care from a physician, otherwise the bones would have overridden far more.[110]

Erc49 is an example of what happens when a fracture is not attended to by someone who knows how to set the bone. He was probably a labourer, aged about 41, who had sustained multiple fractures, either all at one time or very close to each other in time. The fracture that is of interest here is that of his right radius. The fracture overrode by 22mm, far more than the similar fracture sustained by Erc62. Also, two new growths of bone on the end of the ulna

[107] Bisel & Bisel (2002) 469.
[108] ibid 469.
[109] The normal values of rotation and flexing of the forearm are about 165 degrees for both. Taylor, MRH in conversation.
[110] Bisel & Bisel (2002) 469.

mean that he would not have been able to rotate the radius more than a few degrees, severely limiting the independent movement of his forearm.[111]

Celsus describes in detail the symptoms of the bone overlapping when it is broken – the most obvious symptom being that the broken limb is shorter. He then states that this having been observed the limb should be stretched immediately.[112] This is what we call traction and is best carried out by someone who knows what they are doing since if not done properly it can cause further damage to the bone and soft tissue. Nevertheless, Celsus describes how to do it and what the signs are that the bone is in the correct place.[113] This man's other injuries make it surprising that he had apparently not seen a physician since the fracture had overridden to such a great degree. He had received a blow to the front of his head, above the right eye, which had left a depression and his right foot was crushed, in particular his first four metatarsals were shortened and twisted compared to those in the left foot. The damage to these bones had stopped them growing which gives us an age of between 10 and 12 when this happened. Since all of these injuries are on one side of his body the most likely explanation is that they all happened at the same time.[114] An accident of the scale needed to cause such damage must have been traumatic indeed and makes the apparent lack of medical care even more surprising.

Overall, it seems that that health of the population in the Vesuvian towns was as varied as health in modern cities. A number of factors will have dictated whether someone would have enough to eat and whether they would reach their full potential height. Disease, naturally, is indiscriminate and even a better diet

[111] Bisel & Bisel (2002) 470.
[112] Celsus VIII10 C.
[113] ibid VIII 10 D-E.
[114] Bisel & Bisel (2002) 470.

could not prevent it spreading throughout the population and people of high and low status every year would have succumbed to disease and died. The elderly and children would have been most at risk, and the family from the House of C. Iulius Polybius may show that even the well off lost children to disease. Henneberg and Henneberg postulate a number of reconstructions of who was related to whom. They highlight that the children in the house follow the pattern of pre-Malthusian birth spacing – one child born to a married couple roughly every three years but there is no five-year old in the group, as would be expected with this model. It is possible that this child, if indeed there was one, died from disease either as an infant or when slightly older.[115]

However, disease was not the only thing that a physician attended to, he would also be needed for the setting of broken bones. In this area he could be more sure of success, although secondary infection of a compound fracture (where the skin is broken thus allowing infection into the fracture site) was a risk. With disease the patient could die despite the physician's best efforts, while a broken bone could be set and bandaged and, as long as the bone had not broken the skin or punctured an internal organ, leading to infection or bleeding, the chances of a successful recovery were high. The examples discussed above show that broken bones could heal and, if well set, could cause the person no real inconvenience once healed. It is, therefore, not surprising that there are a number of instruments for bone surgery among those from Pompeii, and that in the set from Rimini they are the most prominent instruments. However, this could be for two reasons: firstly, they are the most easily recognised instruments

[115] Henneberg & Henneberg (1996) 257.

with specific functions and, secondly, they tend to be quite large and solid and, as a result, survive where smaller, more delicate instruments do not.

Doctors and their status

The status of doctors in the ancient world is an area of debate in modern scholarship and it would not be possible to do it justice in the space available. My aim, therefore, is to make a survey of the major points and to bring together an overview of this topic in order to compare the status doctors in the Roman towns to that of those in the Roman army.

There was a difference in the status of doctors between the Greek Eastern and Roman Western empire but this is to be expected. In Greece there were highly respected families of doctors who also taught those from outside their families for a fee. This respect for doctors, which did not have the Roman suspicion of Greeks and their medicine, would have affected the status which a doctor could attain and, thus, led to the far greater incidence of doctors holding public positions in the East.[116]

Doctors appear to be something of an anomaly in Roman society. If you believe Pliny the Elder and Cato the Elder they were unwelcome and unnecessary. Pliny in particular is famous for his vitriolic attack on doctors in his 'Natural History'.[117] His dislike of all things Greek is almost legendary and he recounts the cautionary tale of the first Greek doctor at Rome, Archagathus, who, although he was invited to the city to practice medicine and given a shop at a crossroads in 219BC, he quickly earned the nickname *Carnifex* because of his over-eagerness to use the knife and cautery.[118] This story, coming as it does

[116] Nutton (2004) 257.
[117] Pliny XXIX 16-23.
[118] Pliny XXIX 12-13.

from Pliny, who is deliberately setting up a comparison between Greek medicine and the Roman traditional treatments,[119] must be taken with a pinch of salt. Pliny is not alone in this attitude, Cato the Elder wrote to his son warning him against Greek doctors who, he claimed, had sworn an oath to kill all foreigners.[120] It is possible that Archagathus' contract came to an end and he wished to leave Rome. For a doctor used to the big cities of Greece and their intellectual traditions, Rome will have seemed something of a backwater in this respect. There is, however, no reason to doubt that there was a doctor called Archagathus at Rome who left in a hurry, but whether that was due to malpractice or a desire to get away on his own part, we cannot know.

Interestingly, Pliny's attack on Greek doctors in particular[121] has been read as a dislike of all things Greek but this is not true as he uses Greek sources for a number of his recommended remedies.[122] This points to a more precise area of strong feeling. Pliny, it seems, does not like doctors in general and Greek doctors in particular. This is most likely due to the traditional ideal that Romans should be self-sufficient in the area of caring for their families. The *paterfamilias* was supposed to be capable of treating his household, not just his wife and children but also the slaves and animals, himself.[123] Pliny's 'Natural History' and Cato's 'On Farming' both contain home remedies for everything from tapeworm[124] to a dislocated hip[125] and, of course, Cato has his cure-all in the form of cabbage.[126] In calling in a doctor the *paterfamilias* was admitting to

[119] Nutton (2004) 161.
[120] ibid 162.
[121] Pliny XXIX 14.
[122] ibid XXIV 156-158 & 163.
[123] Jackson (1995) 189.
[124] Cato 126.
[125] ibid 160.
[126] Cato 156.

an inability to maintain the health of his family and this in itself could be seen as a failure. Howeever, this is a very traditional viewpoint and it cannot be seen as representative of general opinion in the Roman Empire.

The writings of Cato the Elder point to Roman medicine, before the arrival of Greek medicine in Italy, having been the preserve of the *paterfamilias.* Thus the inviting ofa doctor into a home to practice medicine his position in that home might well have been difficult. He was not a slave, nor was he a freedman or a member of the household who had the backing of the *paterfamilias* or who had learnt medicine at his instigation. He fell somewhere between the family and the slaves, more the status of a paid workman who was brought in to plaster a wall, although the flexible language of friendship and institutions of patronage may have helped to assimilate doctors into the households which they visited. However, he also had the advantage of knowledge over the *paterfamilias* and he was trusted with the life of one of the family. This placed him in a position of power and it appears to be this which exercises Cato[127]. Doctors, by the very nature of their profession knew of drugs which were beneficial, but this could also be abused in order to kill a patient, if such a move was lucrative to the doctor and he had the inclination to do so. Both Cato and Pliny want to look down on these professionals, who are mainly foreigners, yet both of them have clearly read Greek texts on medicine. It seems that they themselves are not quite sure where doctors fit into society. A successful doctor in Rome, especially one who was doctor to the upper levels of society, could have earned enough money to live comfortably, as we shall see below Galen seems to have had no problems with money, although he is

[127] Cato 126

something of an anomaly, being doctor to the emperor Marcus Aurelius. Whether a doctor hired by the city charged his patients for his services is something we can only speculate about. Pliny of course states that the Roman populace,

> 'rejected...the medical profession mainly because they refused to ransom their lives with doctors' fees'.[128]

However, this should be taken as an overstatement as it is unlikely that the vast majority of Romans looked down on doctors in the same way that Pliny did but it may have a grain of truth in it. A visit from the doctor will have cost money and not everyone could afford that. Those who could not would have had to either treat themselves or rely on the local remedy seller or wise woman for advice and medicine.

I have mentioned Galen, who is probably Rome's most famous physician. However, he was not a typical doctor and cannot be viewed as such. Galen came from a wealthy family in Pergamum and undertook extensive training with a number of teachers who were mostly Hippocratics and had an interest in anatomy.[129] This latter interest obviously rubbed off on Galen who had a penchant for public dissection.[130] His first job was as surgeon to a gladiatorial troupe in Pergamum[131] but he eventually rose to physician to the Emperor Marcus Aurelius and his family.[132] Most doctors would never rise to such heights and, therefore, Galen cannot be used as an example of a typical doctor. However, he does give us an idea of how the doctor-patient relationship worked for the upper class. Singer describes the doctor to the elite of Roman as

[128] Pliny 29.16.
[129] Nutton (2004) 216-217.
[130] ibid 224.
[131] ibid 217-218.
[132] ibid 225.

being more a part of his entourage than someone who only appeared when he was ill.[133] In addition, he highlights the intense competition between doctors at this time for patronage from these influential members of society. The example he uses is from Galen's *On Prognosis* and, of course, Galen is showing himself in the best light in relation to diagnosing a problem with the emperor, Marcus Aurelius', health. This kind of individual attention from numerous doctors was unlikely to be the experience of the poor. However, Galen is also part of the overlap between the army and the domestic spheres. In AD 168 he was summoned to attend Marcus Aurelius and Lucius Verus as they prepared to go on campaign.[134] Whether he was doctor to the army is a matter for debate. My feeling is that it is more likely that he was merely there as personal physician to the Emperors but the possibility of him treating the ordinary soldiers, if the situation required it, cannot be completely dismissed.

There are a few surviving decrees relating to doctors in the ancient world. A fragmentary decree from the 30's BC allowed doctors throughout the Roman Empire immunity from taxes and exemption from military call-up and having soldiers billeted on them. These privileges were in addition to the grant of citizenship to all doctors in Rome by both Julius Caesar and Augustus.[135] However, these privileges were later restricted by an edict of Antoninus Pius which limited the number of civic doctors eligible for immunity from taxes to five in small towns, seven in larger towns and ten in the largest.[136] In addition, a ruling by the lawyer Ulpian defined those who were doctors, and who could sue for fees as such, as including specialists in the treatment of ears, fistulae

[133] Singer (1997) IX.
[134] Nutton (2004) 225.
[135] Nutton (2004) 249.
[136] Nutton (1977) 201.

(long, pipe-like ulcers with narrow orifices) and teeth as well as midwives who had shown knowledge of medicine. Those who used incantations, imprecations and exorcisms were excluded.[137]

There are many inscriptions relating to doctors in the Roman Empire and also, as we shall see, to those in the army. These can provide some hints as to their status but also muddy the waters with the variety of terms used to describe doctors. The three different titles used are *medicus*, *iatros* and an *archiatros.* As far as we know, there are no differences between the *medicus* and *iatros.* However, *archiatri* is a term with a very specific meaning and it grows in use after the edict of Antoninus Pius mentioned above. As a title it denotes a civic or Imperial physician and, with the restriction on the numbers of civic doctors it seems that people were keen to highlight that they were a member of this exclusive group.[138]

So it seems that there were at least two levels of doctor within the profession itself. Those who were *archiatroi* and those who were *medicus* or *iatros*. However, this was more of a civic than a professional difference[139] and while it may have increased the public profile of those who were *archiatroi* in that they had the recommendation of the town council would it have actually affected their status within the community? It is certainly more likely to have been instated with the intention of affecting their status than their purses.

Nutton notes that while royal physicians were at the apex of the medical profession, such as it was, and the travelling doctors who toured local towns and villages were at the other end of the scale, the vast majority of doctors fell

[137] Nutton (2004) 249.
[138] Nutton (1977) 201.
[139] Nutton (1977) 207-210.

somewhere in the middle, living in one place and using that either as a base for travelling or for setting up a dynasty. There is Hellenistic evidence for doctors paying taxes as farmers in their villages and having estates with orchards.[140] This places the doctors at the same level as village craftsmen, who were skilled in what they did and charged a fee for it.[141] Elsewhere doctors are on the same level as the public teacher and trainer in archery who are wealthy enough to be full citizens but not to be part of the political elite.[142] More relevant is the evidence from Seneca who has high praises for his doctor, although Nutton points out that these high praises are more likely to be due to his low expectations of his doctor than any other cause. Nutton places Cicero's 'liberal and well-bred art' of medicine[143] into context and comes to the conclusion that while medicine was a 'liberal and well-bred art' when compared to the work of tax collectors, carpenters, cooks and dancers, as discussed by Brunt,[144] it was below oratory, politics and estate agriculture. Therefore, it was only suitable for those of the appropriate social class.[145]

Nutton notes a number of doctors who were physicians to the Imperial family but is at pains to underline that they were the exception rather than the rule.[146] In the Western empire there are a large number of inscriptions of slaves and ex-slaves of both sexes who are doctors. This phenomenon may well be part of the Roman perception that medicine was something which was carried out by foreigners, ex-slaves and transitory practitioners. This in itself will have contributed to the relatively few numbers of doctors who are seen to be holding

[140] Nutton (2004) 152.
[141] Pleket (1995) 33.
[142] Nutton (2004) 253
[143] Cicero *De Officiis* 151.
[144] Brunt (1973) 12-15.
[145] Nutton (2004) 253.
[146] ibid 254-256.

public office in the Western empire.[147] It has to be remembered that for some doctors a spell of work in the army may have been quite attractive, as we shall see in Chapter 3. This implies that they could earn more money in the army than they could in private practice in a town. Not all doctors had a city practice which brought in 500,000 sesterces annually as Xenophon, some time physician to the Emperor Claudius, did.[148]

From this brief overview we can see that the status of doctors was variable and ambiguous. It varied from the East to the West of the empire and from case to case. Overall, there was a greater chance for doctors in the East to rise up the social ladder and hold public office than there was in the West, due to the different attitudes to doctors there. A few doctors made it to the top and were physicians to the Imperial family but most doctors appear to have been on a par with craftsmen. Their services were required and paid for but they were not accepted as the social equals of the orators and politicians. The trend in the West for doctors to be foreigners, ex-slaves or slaves will have contributed to the tendency for them to be viewed with the kind of suspicion demonstrated by Cato the Elder and Pliny the Elder. Within the medical profession those who could persuade the civic council to grant them tax immunity could call themselves *archiatros* and gain additional standing from it, but that did not necessarily put them in a position whereby they could take part in local politics.[149]

Unlike the army where there was at least some degree of official ranking, as we will see in Chapter 3, there was no official structure or ranking of different types of doctors apart from the differentiation between *archiatros* and

[147]Nutton (2004) 258-259.
[148] ibid 254.
[149] Pleket (1995) 31.

medicus or *iatros*. There were specialists in the towns but most doctors in small towns are unlikely to have been able to specialise, they are more likely to have had to carry out whatever was required of them. While most doctors never made it to the elite level of society it does seem that the majority were at the same level as upper middle-class craftsmen, what Pliny the Elder called the *plebs media*.[150]

Instruments

A large number of medical instruments are among the minor objects from Pompeii and Herculaneum in the Naples Museum but, unfortunately, they are not unproblematic. The main problem with them is the way in which they were excavated and recorded, as noted in the introduction to this chapter.[151] This has left much to be desired and frequently it has been impossible to say where specific instruments came from, as can be seen in Appendix I. Looking, for example, at the probes, out of twelve instruments or possible instruments only three have certain provenance. A further two are known to come from Pompeii while seven cannot even be placed in a specific town.[152] This is a particular problem where instruments are known to have been found together but the individual instruments can no longer be identified because of this. Unfortunately, the way in which they were subsequently stored has also left much to be desired and many instruments have deteriorated or completely disappeared.[153]

[150] ibid 33.
[151] See p.11ff.
[152] Appendix I, 1.1.
[153] Bliquez (1994) 32 shows an example of this.

Bliquez has written a catalogue of the instruments and minor objects in the Naples Museum,[154] which Künzl praises as having "accorded scholarship a great service".[155] The inclusion of the minor objects in the catalogue is because the instruments are classed as such and have, therefore, been stored with other, miscellaneous, minor objects in the Museum.[156] This means that it is impossible to sort the medical from the toilet and household items in many cases, particularly with items such as spatulae and tweezers which could have been either domestic or medical in function.[157] While most of the instruments come from Pompeii, there are some from the villas around the Bay of Naples and a few from Herculaneum. However, it seems that many from Herculaneum appear to have been mistakenly assigned to Pompeii, and to the House of the Surgeon in particular.[158] While this is not essential for this study to be able to separate the instruments from these two towns, ideally we like would be able to separate . To add to this already complicated situation, the museum acquired the Borgia Collection in 1817 which contained pieces from Velletri and Rome, as well as from outside Italy. The items from this collection have, unfortunately but not surprisingly, become mixed up with those from the excavations of Pompeii and Herculaneum, adding to the confusion and, while there is a catalogue it does not state the origins of the individual pieces and there is no evidence that any of them came from the Naples area.[159] Bliquez has done a tremendous job in cataloguing the Naples Museum collection of surgical instruments and other minor objects but, despite this, some pieces remain

[154] ibid 6.
[155] Künzl (1999) 591.
[156] Bliquez (1994) 6.
[157] ibid 6-7.
[158] ibid 19-23.
[159] Bliquez (1994) 30-31.

missing or obscure.[160] Nevertheless, this is a significant body of material which can contribute greatly to our understanding of the practice of medicine in Roman towns and, through this, to the comparison with medicine in the Roman army. In this chapter I will be using those instruments catalogued by Bliquez, which I have tabulated in Appendix I. However, it is not possible to examine all of the instruments from the Vesuvian towns in detail here so what I will do is provide a brief overview, which owes much to Bliquez's catalogue, while Appendix I is there for the interest of those who wish to see how those instruments which I have singled out fordiscussion compare to the others of the same type from the museum. The objects which I have singled out for particular discussion have been chosen because they are representative of the various types of instruments, being well preserved and either typical in design being to similar instruments found elsewhere in the Roman world or unique to the Vesuvian towns.

The types found in the Vesuvian towns and those found in army contexts are broadly the same, although there are some types which have not been found in the military setting. On a basic level there are scalpels,[161] hooked instruments,[162] elevators,[163] for lifting broken bones when setting them, and chisels,[164] cauteries,[165] which were heated and used for a wide range of operations including split lips and infected bone, spatulae[166] for applying medicaments, spoons and ligulae[167] for getting medicaments out of narrow-

[160] ibid 1-5.
[161] Appendix I 1.1 & Appendix II, Fig. 13-15.
[162] Appendix I 1.4 & Appendix II, Fig. 5-7.
[163] Appendix I 1.8 & Appendix II, Fig. 16-18.
[164] Appendix I 1.8 & Appendix II, Fig. 19.
[165] Appendix I 1.2 & Appendix II, Fig. 2.
[166] Appendix I 1.10 & Appendix II, Fig. 26-27.
[167] Appendix I 1.11 & Appendix II, Fig. 28-31.

necked jars, probes[168] and needles,[169] forceps and tweezers,[170] specula[171] for internal vaginal and anal examination, carrying cases for instruments and medicaments[172] as well as a number of other cutting instruments and various tubes. Of all of these, the ones which stand out as not having been found in a military context are the tri- and quadrivalve specula. The most likely explanation for these instruments not being found in a military context is that they required skilled craftsmanship for their manufacture and would, therefore, have been very expensive. No physician would want to leave such an instrument behind. Interestingly, there are some types, such as saws, gouges[173] and some types of needle,[174] which have not been found in the Vesuvian towns but I will examine them in more detail below. A number of items which have been classed as surgical in the past Bliquez believes to be domestic in use because they are far larger than their surgical, or even toilet, counterparts.[175]

The 'Basic Kit'

The instruments of the 'basic kit', [176] probes, cautery, hooks, forceps, needle and scalpels,[177] are present in the instruments at the Naples museum and, while I will not discuss each instrument type in detail, I will examine the main types and discuss examples of them from the Naples Museum. For the rest I will make a brief survey as this is only one aspect of the evidence for the practice of medicine in the ancient world.

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[168] Appendix I 1.1 & Appendix II, Fig. 1.
[169] Appendix I 1.3 & Appendix II, Fig. 3.4.
[170] Appendix I 1.5 & Appendix II, Fig. 9-12.
[171] Appendix I 1.9 & Appendix II, Fig. 22-25.
[172] Appendix I 1.12 & Appendix II. Fig. 32-35.
[173] Bliquez (1994) 72.
[174] ibid 74.
[175] ibid 47.
[176] Jackson (1995) 193.
[177] Appendix II, Fig. 1-6 & 12-15.

Probes[178]

There are numerous examples of probes in the Naples museum but just one simple probe has a definite medical provenance, No.**206** (Fig.1)[179] which was found in the Casa del Medico Nuovo (II)[180] along with a case and six other instruments, all of which appear to have been in the case with it.[181]

Cauteries[182]

While not as likely as the probe to be used, since it was seen as a last resort,[183] the cautery was important as it could be used for a wide variety of operations with minimal risk of post-operative infection, due to it having to be heated for use. There are two definite cauteries in the Naples museum, Nos.**103** (Fig.2) and **104**.[184] Both have a metal plate which is off-set from the handle so that only the plate would touch the patient and are a type unknown outside Pompeii.[185] However, whether this is due to them being unique to Pompeii, or because none of this type have survived elsewhere, is not known. This does give us an earliest date at which we can confidently state this type of cautery was in use but, without examples from other sites with different dates, it is impossible to say for how long this type might have been around or whether it was in use in later periods in different parts of the Roman world. Very few cauteries have survived, due to their usually being made of iron which corrodes easily and the probability that, if they were broken or damaged, they would be melted down in order to reuse the metal. Importantly, Bliquez points out,

[178] Appendix I, 1.1.
[179] All Figures are in Appendix II.
[180] Bliquez (1994) 84-86.
[181] Bliquez (1994) 54 & 84-86.
[182] Appendix I 1.2.
[183] Celsus VII 2.4.
[184] Appendix I, 1.2 & Bliquez (1994) 134.
[185] Bliquez (1994) 28.

anything which was made of metal and could be heated could have been used as a cautery, including needles[186] and those *ligulae*[187] whose pointed handles make them ideally suited to being placed into a wooden handle so that the physician would not burn his hand during the operation.[188]

Needles[189]

There are a great variety of needles which the surgeon would have had to hand, ranging from the simple needle, which could have been used as an eyed probe or for stitching bandages together, to the far more elaborate cataract needle with its specialised function but which could also be used as a cautery when heated. In the Naples museum there are needle holders made of bronze[190] which would have held an iron or bronze needle such as No.**221** (Fig.3). This could also have been used as a cautery for the treatment of conditions such as trichiasis[191] while No.**220** (Fig.4) would have been used to depress cataracts as described by Celsus.[192] There are needles which are combined with another instrument, as can be seen in No.**225** (Fig.3), which was combined with a probe, while No.**81** (Fig.5) was combined with a sharp retractor. While it is listed as a 'retractor/cataract needle' in Appendix 2 in Bliquez[193] there is no reason to believe that it could only have been combined with a cataract needle, it is also possible that it could have held a blade since some of the instruments from Rimini have a scalpel blade in just such a socket.[194]

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[186] Appendix I, 1.3 & II, Fig. 3&4.
[187] Appenix I, 1.11, 50-53.
[188] Bliquez (1994) 45.
[189] Appendix I 1.3.
[190] Appendix I, 1.3.
[191] In-growing eyelashes usually caused by infection and leading to blindness if not treated.
[192] Celsus VII 7.14D-F.
[193] Bliquez (1994) 223.
[194] Jackson (2003) 316.

Hooked instruments

Bliquez lists 30 hooked instruments in the Naples museum[195] of which 21 are retractors (sharp hooks), used for holding the edges of wounds open or in the operation to remove tonsils as described by Celsus, the tonsil was extended using a sharp hook in order to make the removal of it with a scalpel easier.[196] Two of these have another instrument instead of a finial, No.**81** (Fig.5) is combined with a needle socket. Six are embryo hooks, for removing a dead foetus from the womb and two are 'hooklike objects of underdetermined purpose'.[197] All of the retractors and embryo hooks have decorated handles (see Appendix I, 1.4). Interestingly No.**71** (Fig.6) has chunks of rust on it[198] and there are spots of rust on No.**74** (Fig.6).[199] This implies that both were in close proximity to iron or steel instruments. Since No.**71** comes from the Casa del Medico Nuovo (II)[200] and No.**74** from the House of Marcus Lucretius,[201] both sites where a number of other instruments were found, this is not really surprising. It is possible that they were lying next to scalpels, or other instruments with iron or steel parts. As these corroded, the rust became attached to the neighbouring instruments. This points to these instruments possibly being part of sets kept either by a physician or by the *paterfamilias* for the treatment of his family and slaves.[202] Unfortunately, the lack of detailed records showing the way the instruments were lying when found means that this can only be speculation. The bifurcated (blunt) hook would have been used for

[195] Appendix I, 1.4.
[196] Celsus VII 12, 2.
[197] Bliquez (1994) 124-130.
[198] ibid 126.
[199] ibid 127.
[200] Bliquez (1994) 126.
[201] ibid 127.
[202] According to Pliny (XXIX vii-viii), Cato the Elder treated himself and his household and Pliny holds him up as an example, but how many were actually capable of doing so is unknown.

holding back the edges of a wound where piercing the flesh with a sharp hook was not an option, such as when raising tendons, veins and arteries out of the way in the course of an operation or for isolating varicose veins when operating on them as described by Celsus.[203] The only example from Pompeii is No.**A52** (Fig.7)[204] There are also three other blunt hooks from the Antiquarium at Pompeii two of which, Nos.**A53** and **A54** (Fig. 8) Jackson classifies as possible eyelid retractors, but which Milne thought might have been lithotomy scoops (for the removal of bladder stones).[205] Since surgical instruments were not confined to a single use it is possible that these instruments were used for all these purposes.

Forceps

Forceps and tweezers are among the most common items found in Pompeii[206] but this is due to the wide use of tweezers in domestic contexts which means that a medical function cannot be assigned to them unless they were found with other instruments which are unequivocally medical in their function. Nos.**242** (Fig.9) and **244** (Fig.10) have been attributed to the House of the Surgeon but this cannot be sustained. However, there are comparison pieces which have been found with surgical instruments elsewhere for the former, while the serrated jaws of the latter instrument and lateral protrusions at the same level as the rivet, which echo those on instruments with surgical parallels, such as No.**242,** point to it having a medical function.[207] No.**253** (Fig.11) is a simple hair-pin arrangement but also has exact surgical parallels while No.**242**

[203] Celsus VII 31
[204] Bliquez (1994) 214 ill. 217.
[205] ibid 215.
[206] Appendix I 1.5..
[207] Bliquez (1994) 58-59.

is particularly well made with beautifully worked lower handles and close-fitting, serrated, curved jaws. The design is similar to, but not the same as, that on the handles of two of the three pairs found at Rimini.[208] This sturdy type of forceps was designed to remove detached or partially-detached fragments of skull but could also be used, for example, to remove embedded weapons (although this would perhaps be required more in the army context), clamp severed blood vessels or possibly even to remove teeth.[209] No.**245** (Fig.12) is made of one piece of copper alloy with broad, side-swept, serrated jaws and a sliding catch so the grip could be maintained with ease.[210] There are surgical parallels for it elsewhere so it is reasonable to assume that it was used for surgical purposes. Interestingly, this is one of the instruments Bliquez has catalogued as probably being from Herculaneum.[211] Bliquez leaves the question as to the function of those instruments without serrated jaws open since these are most likely to have been toilet items. This does not, however, mean that physicians did not use such tweezers. They could be used for the removal of foreign objects from the ear, bone slivers from a broken nose, or even in-turned eyelashes or infected in-growing hairs, but the provenance, where we have it, points to these being domestic in use.[212]

Scalpels[213]

The scalpels in the Naples museum bring up a number of issues which require a more detailed discussion. They fall into three categories, those which

[208] Jackson (2003) 317-318.
[209] ibid 318.
[210] Bliquez (1994) 59&172.
[211] Bliquez (1994) 172 & 61.
[212] ibid 59-60.
[213] Appendix I 1.6.

are Type I,[214] those which are Type II[215] and those which are neither of these. The two Types are those which Jackson described in his 1986 article[216] While the two Types are useful, I think that they tend to blind historians and archaeologists to the existence of other types of handle, outside these most common styles.[217] Type I handles have a solid rectangular grip which is usually plain with rolled terminals at the end closest to the blade (Fig.13). Sometimes these rolled terminals are replaced by incised lines and occasionally there is decoration on the grip, as in the case of the six-pointed star which is examined further below.[218] The Type II scalpel handles are generally smaller than the Type I handles and have an octagonal grip with a slimmer leaf-shaped dissector (Fig.14). These differences have traditionally been seen to demonstrate a difference in function with the smaller, Type II handles being thought to have had smaller blades more suitable for delicate surgery such as that on the eyes. However, this has more recently had to be re-examined following the discovery of the *Domus* 'del chirurgo' in Rimini where the blades of the scalpels had been preserved.[219] I think that, to a certain extent, these different types of handle may come down to personal preference on the part of the physician as regards surgery on different parts of the body. The rectangular grip would allow the surgeon to hold the instrument like a knife while the smaller, octagonal grip would lend itself more to being held like a pencil.

The scalpel handles with the depiction of Hercules (Fig.15) have been treated by Bliquez in a separate section of his catalogue since it is unique to the

[214] Bliquez (1994) 113-116.
[215] ibid 117-118.
[216] Jackson 1986 133.
[217] ibid.
[218] See p.51-52.
[219] Jackson (2003) 312-321.

Vesuvian towns.[220] He points out that there is a link between Hercules and Aesculapius, the god of healing.[221] He suggests that the appearance of Hercules on the handle of what is unquestionably a surgical instrument is due to his role as ἀλεξίκακος or "protector against evil". In relation to this Bliquez points out that the Hercules motif usually appears on those instruments which cause intense pain or are used in situations of such levels of pain that this protection would be needed. Thus the Hercules motif acted as an apotropaic device to promote the health and survival of the patient as well as aiding in the endurance of the pain involved in the surgery.[222] This motif has not been found outside Pompeii[223] which implies that these scalpels were only made there, although it is possible that they just have not yet been found elsewhere. With the discovery of No.**41** (Fig.15) in the metalworker's shop near the Porta Stabiana we not only have a unique design but also the probable site of manufacture.[224]

A number of the scalpel handles which lack a dissector have a roughly incised X or six-pointed star on the grip. Among these are those with the Hercules motif and here it is important to keep in mind that No.**41** (Fig.15) was found in the metal-worker's shop near the Porta Stabiana.[225] Bliquez mentions the X or star in passing but does not make anything of it[226] while Jackson treats it as a form of decoration on No.**A45.**[227] Since Nos.**40-43** and No.**A45** are all definitely from Pompeii and the others are at least from the vicinity of the city, this may be either a maker's mark or a mark made by the owner of the

[220] Bliquez (1994) 99-106.
[221] ibid 102-103.
[222] ibid 103.
[223] ibid 7.
[224] Bliquez (1994) 35 & 119.
[225] ibid 119.
[226] ibid 35.
[227] Jackson (1994)b 212.

instruments to indicate that they were his. If it is a maker's mark the scalpel in the metalworkers workshop is one that has just been made, while if it is a mark of ownership it would be in for repair, most likely to have the blade replaced. Since the marking is incised it is more likely to have been added after the instrument had been made. This is in favour of it being an identification mark for an owner rather than a maker's mark. Jackson notes that the star is on the two main faces of the grip[228] so it could be argued that this was purely decoration of the type which was designed to improve the physician's grip on the instrument, since it is where he would have had his finger and thumb while using it. It iscruder than other decoration, such as that found on the sharp hooksbut there is no reason why this decoration may not have had a dual purpose improving the grip of the physician and indicating either who had made or owned it. This indication of ownership or maker demonstrates the value of the instrument to those who used or made them. The level of workmanship is such that they would not have been cheap.

There are three types of socket in the scalpel handles for the blade. One is a simple straight socket, the second is a wedge-shaped socket, and the third is a keyhole-shaped socket.[229] The idea that the rolled terminals mentioned above might have been used, with the aid of wire, to hold the blade in place, as noted by Milne,[230] has been discounted by Bliquez,[231] among others. The blades would not have been easily interchangeable as they were held in place with solder,[232] which, on some of the instruments, is still visible. The presence of

[228] ibid 212.
[229] Bliquez (1994) 33.
[230] Milne (1970) 24.
[231] Bliquez (1994) 33.
[232] Jackson (1987) 133-134.

graded sets of scalpels in graves[233] and at Rimini[234] indicates that blades were not interchanged but rather that it was normal for a physician to have a set of scalpels. We will see that it is more than likely that doctors in the army also had sets of scalpels since they were kept in cases and, therefore, were easily transported.

In total there are 28 scalpels in the Naples museum,[235] not as many as might be expected but as scalpels were often kept in cases which allowed for easy transport, it is likely that many more were removed from the Vesuvian towns before the second stage of the eruptions during which the towns were destroyed. When compared to the number of spatulae[236] the number of scalpels seems paltry, but while scalpels were purely medical instruments spatulae could be used as both medical and toilet items. Therefore, it is more likely that there would be more of them and that proportionally more would be left behind in the rush to leave the town as they would not be considered to be as valuable.

The possible total number of scalpels in a single *instrumentarium* is provided by the find at Rimini where there are over 40 scalpels and surgical knives.[237] This is a huge number but the reason for this is provided by the different sizes and types of blade which were found as part of these instruments. There are over 10 different types of blade, some of which are very small and some are pegged into sockets which have previously been interpreted as needle-

[233] Künzl (1982) for example 80 & 82, the grave goods from Bingen.
[234] Jackson (2003) 314-316.
[235] Appendix I, 1.6.
[236] See p.58ff.
[237] Jackson (2003) 314.

holders.[238] Some were found in copper-alloy boxes while others were top to tail in bundles with other instruments, kits ready for use.[239]

Other Instruments

Bone Levers[240]

Bone levers (or elevators) were among those instruments which were used when dealing with fractures. Interestingly, Celsus does not mention bone levers at all, although he does advocate the use of forceps, 'such as smiths use', to aid the repositioning of a bone in a compound fracture, i.e. one in which the broken bone has pierced the skin.[241]

Bliquez notes three examples of bone levers from Pompeii,[242] two of which are complete, Nos.**91** (Fig.16) and **92** (Fig.17) while only the central handle of the third, No.**93** (Fig.18) remains as its functional ends were iron.[243] On the two complete examples we can see that the ends were arched away from the handle and serrated on the interior to provide the physician with greater purchase on the bone and point in opposite directions. No.**91** has blunt ends and a plain grip while No.**92** has pointed ends and moulded rings flanking a fine lattice pattern on the grip. No.**93** also has a fine lattice pattern and moulded rings on the grip, features which were probably not just for decoration.[244]

[238] ibid 314-316.
[239] ibid 316.
[240] Appendix I 1.8.
[241] Celsus VIII 10, 7 G.
[242] Appendix I, 1.8, 1-3.
[243] Bliquez (1994) 131
[244]ibid 131.

Chisels[245]

Celsus does mention chisels. Indeed, he advocates their use so much that one could be forgiven for thinking that ancient bone surgery was more about removing bone than the setting of fractures.[246] Unfortunately, the bandages and splints which were used for setting bones do not survive, we only know of them from the literary sources, as the archaeology only preserves the more robust metal instruments associated with the surgical treatment of more complicated fractures. The chisels which Celsus writes about are of the unguarded variety where, when using them on the bones of the skull, the physician had to be careful not to damage the underlying membrane.[247] However, there were also *lenticulars* or guarded chisels (Fig.19). These had a slim blunt projection, which was slightly convex in profile, from one corner of the blade. This projection was on the bottom corner of the blade when the chisel was in use, thus protecting the membrane from the sharp edge of the chisel. Four of these were found at Rimini, the first time complete chisel blades have been found, along with normal, unguarded, chisels.[248] We cannot know whether the chisels from Pompeii were *lenticulars* or not but it could be that, since Celsus, who was writing in the first century BC to the first century AD, does not mention them it is possible that they had not yet been invented. In addition, the find from Rimini is dated to AD257-8,[249] at least two centuries after Celsus was writing and nearly two centuries after Vesuvius erupted. It is entirely possible that the *lenticular* had been invented in this time and that Celsus' lack of reference to it was due to its non-existence and not to a gap in his knowledge. It

[245] Appendix I 1.8.
[246] Celsus VIII.
[247] Celsus VIII 3, 8.
[248] Jackson (2003) 318.
[249] ibid 313.

is also possible that the terminology was not standard. Most of the examples of chisels cited by Bliquez are not definitely chisels.[250] This is simply because, without the blade to confirm their use, they could also have been handles for other instruments, including embryo hooks or scalpels. However, they have been classed as chisels because the handles have bolt-like heads which appear to be suited to being struck by a hammer.[251]

Catheters

Among the most finely made of the instruments which might be found in a physician's kit were the catheters. A male one was found in Herculaneum (No.**235**, Fig. 20&21)[252] but there is an example of the shorter, female catheter in the *instrumentarium* in the British Museum along with two male catheters of different size.[253] This accords with Celsus' stricture that a physician should have a graded set of catheters, although there are not as many as he would have expected. He recommends three for men and two for women to allow for patients of different ages.[254]

Specula

The specula are among the most impressive instruments to come from the Bay of Naples. There are two types of specula attested both in the literature and the archaeology. The first type are the trivalve or quadrivalve vaginal specula and the second type are the bivalve anal specula. In the Naples museum there are examples of both types. [255] The quadrivalve speculum is, in fact, the

[250] Appendix I, 1.8, 4-13.
[251] Bliquez (1994) 44.
[252] ibid 54-55 & 57.
[253] Jackson (1986) 126-127.
[254] Celsus VII 26.1.
[255] Appendix I, 1.9.

only extant example of this type.[256] These instruments demonstrate how advanced Roman craftsmanship was and Bliquez points out that their,

> complex designs and intricate decor...represent not only the highest technical achievement among surgical tools, but among ancient handtools in general.[257]

The trivalve and quadrivalve models work on a screw mechanism which, unfortunately, longer functions in any of them.[258] However, we can see how they would have worked. Bliquez pays particular attention to the quadrivalve speculum since it has not been treated in detail before. Interestingly, it is less robust and less carefully finished than the two trivalve dilators and the screw mechanism works by turning anticlockwise while the trivalve dilators work by turning clockwise. This could just be personal preference on the part of the physician or it could be due to the way in which it was made. If it was personal preference on the part of the physician it seems that there may have been a left-handed doctor working in the Casa del Medico Nuovo (I) where it was found. No.**292** comes from the House of the Medicus A. Pumponius Magonianus and No.**293** comes from the Casa del Medico Nuovo (II). There are very few extant specula – only one quadrivalve, and eleven trivalve types, some fragmentary, survive from across the Roman world.[259] Thus those found at Pompeii are significant and Bliquez states that they point to the prosperity of the town and the high level of expertise that it was able to support.[260] While this may be true it is also possible that, because these will have been expensive instruments to make and buy, they the tendency would not have been put them in graves with doctors but kept by the next doctor which would explain their scarcity in the

[256] Bliquez (1994) 62-63.
[257] ibid 62.
[258] ibid 63.
[259] Jackson (1991) 102.
[260] Bliquez (1994) 64-65.

archaeological record.[261] The bivalve specula are no less important, although they are less complex. They consist of just two arms which are riveted together, for example No. **295** (Fig.25). Importantly, they are not made like modern scissors but one piece is on the left and one on the right, they do not cross at the rivet. These were probably multi-use instruments and could have been used, as Jackson argues, to aid the removal of imbedded missiles from wounds.[262] This use would seem to be particularly pertinent to the army but, as we shall see, wounds were probably less common than illness in the army.[263]

Spatulae

Spatulae[264] were the most common tools produced by Roman bronze workers and there are many different forms of them (Fig.26).[265] However, their most common use was as toilet articles and, therefore, their presence does not indicate a medical house.[266] There are a number of double spatulae as well which are accepted as surgical instruments because they have close parallels in finds from graves of physicians (Nos.**139** (Fig.27), **141-142**). Bliquez has suggested that they were used for plastering casts,[267] but this seems implausible and anachronistic. This is not the only place where Bliquez puts forward this hypothesis,[268] and he appears to have no sources to back it up. I cannot find plaster-casts mentioned anywhere in Celsus and it seems that plaster-casts were not used regularly until 1854 when Antonius Mathijsen's invention of quick-

[261] One has been found in a grave, Künzl (1982) 102.
[262] Jackson (1991) 101-108.
[263] See p.103.
[264] Appendix I, 1.10.
[265] Bliquez (1994) 46.
[266] ibid 46.
[267] ibid 47.
[268] Bliquez (1982) 13.

drying Plaster of Paris allowed for use of it in casts for broken bones.[269] Where the ancient and modern may have become confused is that in ancient times broken bones were not merely bandaged to a splint, a poultice was also applied in order to reduce the swelling,[270] even if it was not a compound fracture. The most likely function is the spreading of medicaments onto wounds but the possibility of them being used as bone elevators must not be discounted since most ancient surgical instruments were multi-functional and, while the shape of the spatula might not be ideal for use as a bone elevator, if that was what the physician had to hand then there is no reason why he would not use it as such.

Cyathiscomele and Ligulae

Under the general heading of 'Spoons and Ligulae' Bliquez treats both the *cyathiscomelae* and the *ligulae.*[271] The *cyathiscomele* is a variation of the spatula but terminates in an oblong spoon. It was named as such by Milne, not by any ancient author, in order to distinguish it from the flat *spathomele*. Milne states that it would have been used both as a sound or probe and as a spoon for measuring and mixing medicaments.[272] Most of these instruments were double-ended with the scoop on one end, a striated shaft, and an olivary enlargement at the other allowing the instrument to be used as a probe, or indeed a cautery when heated.[273] The shafts are almost always decorated and Nos. **146** (Fig.28), **167, 168, 178** and **A4-6** have hafts inlaid and threaded with a spiral of silver wire.[274] Bliquez points out that most of these probably had a domestic, not a medical, function. This certainly seems to be a viable explanation of the

[269] McGrew (1985) 235.
[270] Celsus VIII 10. 1F-G.
[271] Bliquez (1994) 48-52, 145-159
[272] Milne (1970) 61-62.
[273] Appendix I, 1.11.
[274] Bliquez (1994) 48.

frequency with which these instruments are found but is also possible that they were being used for medicines in the domestic context and not just for powders and creams. This is a blurred area in which it can sometimes be impossible to separate the medical from the domestic simply because there is no clear dividing line.

The *ligula seems* in most cases to have been a cosmetic implement, used for removing substances from jars and bottles, not a medical or surgical instrument. Most of the ligulae in the Museum consist of a small flat scoop mounted at an angle to the shaft. The shafts terminate in a point at the opposite end to the scoop.[275] There are just two exceptions to this design, No.**A3** (Fig.29) which has an olivary enlargement opposite the scoop,[276] and No.**80** (Fig.30) which has a sharp hook opposite the scoop.[277] There is only one of the common type of ligula which has a secure medical provenance. That is No.**189** (Fig.31) which was found in Casa del Medico Nuovo (II). It was in a round carrying case, No.**304** (Fig.32), along with six other instruments.[278] Bliquez suggests that they could have been used as cauteries because they were metal and, therefore, easily heated and the pointed handles would lend themselves to insertion into a wooden handle to protect the doctor from burns. This is likely in the light of the multiple functions which most Roman medical instruments had.

[275] Bliquez (1994) 48-49.
[276] ibid 202, ill. 203.
[277] ibid 128.
[278] ibid 49.

Medicine/instrument cases[279]

There are a large number of medicine and/or instrument cases in the Naples museum. No.**296** (Fig.33), a rectangular medicine box, was found in the Casa del Medico dei Gladiatori and has compartments which still contain pills but No.**297** (Fig.34) is just a box with a sliding lid, was not found with any surgical instruments and, therefore, may not have been used for medicines at all.[280] The cylindrical cases are far more numerous than the rectangular ones. A number of the cases had contained instruments but Bliquez found that reassembling the correct instruments was possible in only one instance, No.**304** from the Casa del Medico Nuovo (II).[281] Three of the cases which had held medicines still contained the remains of powders, Nos.**311** (Fig.35), **312, 314**. Bliquez suggests that it is likely that the shorter cases contained medicines and the longer ones instruments but admits that it is impossible to be certain except in a few instances as to whether this is true or not.[282] Whether there was this kind of standardisation it is clear that some cases were used for instruments while others were used for instruments. The medicine cases may not necessarily have belonged to a physician but could have been part of an individual's toilet items. The instruments are more likely to have belonged to a physician and these compact carrying cases point to the necessity to carry instruments, sometimes sharp ones, easily. This is a further reminder that in the ancient world people did not go to the doctor in the way that we do today, instead the doctor went to them.

[279] Appendix I 1.12.
[280] Bliquez (1994) 66.
[281] ibid 67-68 & 84-86.
[282] Bliquez (1994) 68.

Missing types

There are some instruments which have not been found in the Vesuvian towns and the main ones are as follows: No lancet can be firmly attributed to the Vesuvian towns, the only example is from the Borgia collection.[283] Instruments such as saws and gouges used in bone surgery have not appeared but are rare finds in general.[284] The various types of cautery are missing but as they are made of iron this is unsurprising since they are likely to have disintegrated.[285] Among the needles the hollow type for extracting cataracts is missing but, as the only two examples are from one site in France, that is unsurprising.[286] The sharp spoons with cutting edges used in gynaecology and the removal of diseased bone have not been found nor the 'scoop of Diocles'[287] as described by Celsus.[288] Most noticeably, when compared to the finds from Rimini is the absence of two specialised forceps, the *staphylagra*, used primarily for removing the diseased uvula but also used for crushing piles, and the *staphylocaustes* which was used for the application of caustics. There arepossible explanations as to why these might be missing: that they were taken by the people leaving the town or that they simply did not exist at this time. It would be nice to think that here we have evidence for development in Roman medical instruments but this is only a hypothesis and therefore must be approached with caution.

Interestingly, the lack of staphylagra and staphylocaustes from the Vesuvian towns, taken with the lack of mention of them in Celsus points to the

[283] ibid 70-71.
[284] ibid 72.
[285] ibid 73.
[286] ibid 74.
[287] Bliquez (1994) 74-75.
[288] Celsus VII 5.3.

possibility that they had not yet been invented in the first century AD. Additionally, Celsus' lack of a noun for the bivalve dilator points to it being either a new instrument or one which he had not come across before.[289]

Marcianopolis

The finds from Marcianopolis (Dvenya, Bulgaria) are among the richest found.[290] The set of instruments found comprises three lithotomy knives,[291] two knives for the breaking up of the stone,[292] a lithotomy spoon which has a double hook at the opposing end,[293] a blunt hook with a sharp point at the opposing end,[294] a possible bivalve speculum,[295] a partial trivalve speculum,[296] a possible embryo hook,[297] a possible instrument for destroying the foetus *in utero,*[298] a bronze, folding bow for use with a crown trephine[299] and two handles possibly for ophthalmic needles,[300] although the finds from Rimini (see below) have shown that such handles can actually hold surgical blades. This diverse collection points to a physician who carried out lithotomies, gynaecological procedures and ophthalmic surgery, possibly among other, more general, procedures. This also indicates that, while specialisation may well have been a feature of the practice of ancient medicine, there were some physicians who carried out a range of procedures from these specialist areas.

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[289] Jackson (1999) 106 & Celsus VII 5.213.
[290] Kirova (2002) 92.
[291] ibid 74.
[292] ibid 76.
[293] ibid 76.
[294] Kirova (2002) 76.
[295] ibid 78.
[296] ibid 82.
[297] ibid 84.
[298] ibid 84.
[299] ibid 86.
[300] ibid 91.

The Rimini Instrumentarium

The discovery at Rimini of a set of 150 instruments is one of the most exciting finds of surgical instruments in recent times because, for the first time, there was what appeared to be a complete *instrumentarium* in its original context which was possibly where medicine had been practised. The excitement generated by this find is easily seen in the initial article on the find by Jackson in the British Museum magazine .[301]

Three things make this *instrumentarium* important for this study. Firstly, the size of the *instrumentarium* which represents as complete a set of instruments as we are likely to find since it appears that only those instruments which would have been made of wood or other perishable materials have not survived. Secondly, it has a secure date of between AD 257-258. Many finds lack such a date since instruments are hard to date unless their context can supply a date. Thirdly, they have been excavated with an awareness that the placement of the instruments within the room, and the instruments with which they were associated is important for understanding the set as a whole.

The *instrumentarium* contains all that a doctor might have needed for everyday work and was especially well equipped for bone surgery, although this may just be the result of the instruments for bone surgery being more robust and therefore more likely to survive the fire and subsequent burial where other instruments did not fare so well. There are over 40 scalpels and surgical knives (Fig.36), 19 spring forceps, a range of sharp and blunt hooks, surgical needles and probes. There are some 40 instruments for bone surgery including, two folding copper-alloy handles used to operate trepans (cylindrical saws for the

[301] Jackson (2002) 20-23.

excision of pieces of skull) and solid-tipped drills used in bone surgery including that on the skull,[302] three *sequestrum* forceps for seizing and removing bone fragments and splinters (Fig.37), levers for elevating fractured bones, chisels, three gouges, four *lenticula* (guarded chisels, Fig.19)) a small, finely toothed iron saw-knife and a small iron file. The gouges and *lenticula* are especially important as none have previously been identified although they are known from the texts. The file could have been used in dentistry and the presence of seven iron dental forceps (Fig.38) point to the Rimini doctor also practicing this. However, these were not the only forceps he possessed, he also had two *staphylagra* and one, much rarer, *staphylocaustes.* In addition, he had a distinctive roughened scoop, called an *uncus,* used to perform lithotomy (the operation to remove bladder stones).[303]

From these instruments we already know that the Rimini doctor could have performed lithotomy, throat surgery, treated haemorrhoids and practised dentistry as well as the more basic forms of surgery, possibly also including eye surgery as the fine needles would have been suited to couching cataracts and cauterising eyelashes turned inwards by *trichiasis.*[304]

Importantly, this *instrumentarium* also points to a specific room in a house where medicine may have been practised, or at least the room from which the doctor went out to visit his patients. This is more important than it might at first appear. As we shall see below, the actual rooms in Pompeii where medicine may have been practised. or from which doctors worked, cannot be identified due to the way in which the site has been excavated and recorded.

[302] Jackson (2005) 118.
[303] Jackson (2003) 317-8.
[304] ibid 317.

Perhaps this makes the *instrumentarium* even more valuable than the instruments themselves.

Instrument conclusions

What do these instruments, and those from the Vesuvian towns, tell us about the practice of medicine in a Roman town? Firstly, there can be no doubt that medicine was being practised in a number of locations in Pompeii and Herculaneum and not only in the houses with the tag 'of the Surgeon' (House of the Surgeon VI 1, 9.10.23, Casa del Medico Nuovo (I) VIII 5, 24, Casa del Medico Nuovo (II) IX 9, 3-5, Casa del Medico dei Galdiatori V 5, 1.2). There is also evidence for medicine in the House of M. Velusius Iuvencus (I 10, 7), the Casa del Primo Piano (I 11, 9.15), the House of Sutoria Primigenia (I 13, 2), Casa di D. Octavius Quartio (II 2, 2), Villa di Giulia Felice (II 4, 1-12), the House of Marcus Lucretius (IX, 3 5.24).[305] However, not all instuments were found in buildings. In the Piazza dell' Anfiteatro an *instrumentarium* was found under one of a group of skeletons, most of it being in a wooden chest. The *instrumentarium* consisted of five round carrying cases, one of which contained; a spatula, cyathiscomele, two ligulae and fragments of two other cyathiscomele. The rest of the cases contained medicines. In addition, there were two forceps, two sharp hooks, one cataract needle, one socketed needle holder and four scalpel handles with leaf-shaped dissectors.[306] This is almost a complete basic kit that a doctor would be expected to own.[307] The only things missing from it are the probes and a cautery, but the socketed needle holder could have held an

[305] Bliquez (1994) 97-98.
[306] Bliquez (1994) 87-88.
[307] Jackson (1995) 193.

iron needle that doubled-up as a cautery. Some of the houses mentioned here will be examined in more depth below. The main question which these instruments can answer for us is what types of medicine were available in Pompeii, Herculaneum and Rimini? It seems that pretty much every type of medicine was to be found in the Vesuvian towns and in Rimini, that is all the procedures which Celsus describes in *De Medicina.* It is likely that each doctor covered all kinds of illness and trauma but there may have been specialist physicians, in particular there is evidence for a gynaecologist. In the house of the Medicus A. Pumponius Magonianus a uterine speculum, three embryo hooks and four bleeding cups were found. These certainly point to a specialisation and it is to be expected, but does not mean that, this physician practised gynaecology exclusively. It seems that anything from a broken bone to a birth could be dealt with by the doctors in Pompeii and Rimini. The finding of the workshop with the Hercules motif scalpel in Pompeii points to there being enough demand for instruments that the local metalworkers were making the most of the business provided by the doctors.[308] However, in addition to answering questions these instruments also raise questions. Why are certain types missing and why is there such a high number of instruments in Pompeii? Künzl asks in his 1999 article on Bliquez's book whether the high number of instruments in Pompeii were a result of the city still being a partial ruin in AD 79 after the AD 62 earthquake or whether the reverse was true, that the earthquake had put an emphasis on self-medication? Was the strong medical presence in Pompeii a direct result of the earthquake in AD 62 and whether we should view Pompeii, not as a normal case but as an exceptional case because of

[308] Bliquez (1994) 35.

the effect of the earthquake?[309] These are questions which cannot be answered but it is important to keep them in mind when examining the evidence from Pompeii. This was not only a disturbed site but may not be the example of normal Roman life that we would like to think it is.

Of course, the most prominent and recognisable instruments at both Pompeii and Rimini are those for bone surgery. This is because they are the largest and least susceptible to damage over time and are the most easily recognised. However, in a world where those who worked for a living worked hard physically, it is unsurprising that bones were broken and needed setting. Not everyone, as we have seen, did receive medical attention but it is likely that there was plenty of work for the doctors in that area. Of course, those instruments for bone surgery could be used for other procedures, for example, bone forceps like No.**242**could be used for extracting teeth.

The instruments found in the Vesuvian towns were left as a result of a natural catastrophe, but one which was gradual enough for a large number of the population to leave the town with their most valued possessions. Therefore, it is not surprising that some specific types of instrument have not been found since the instruments are likely to have been taken by the doctor who owned them. The Rimini *instrumentarium* is also a result of a catastrophe, but a man-made one. The fire which raged through the house was so hot that it actually fused some of the instruments (Fig.37) and it is likely that the extant instruments make up a complete *instrumentarium.*[310] However, this is very different to the circumstances under which those instruments found in Roman forts might have been left. They are most likely, as we shall see, to have been left as scrap metal

[309] Künzl (1999) 590-591.
[310] Jackson (2003) 314

which could not be carried with the army when they were retreating.[311] The forts will have been systematically cleared of anything that could be useful to the enemy and the buildings destroyed.[312] These different methods of deposition mean that we are, of course, presented with very different selections of evidence from the Domestic and the Army contexts which does make it harder to come to concrete conclusions about the nature of the medicine practised in these contexts.

However, there are two things that those instruments from the Vesuvian towns with provenance point to. Firstly, those with provenance tell us where they might have been kept, which might have been the doctor's home and, secondly, where medicine might have been practised in Roman towns. While we cannot be certain that medicine was practised in the houses where the instruments were found, there is a possibility that it was. The instruments were scattered across the town and not concentrated in just one area possibly showing that medicine was not practiced in just one place, although we have to be careful about drawing conclusions from this scattering due to the extended period over which Vesuvius erupted which would have allowed people to move the instruments from one place to another. They also tell us what kinds of surgery may have been practised in Roman towns. Of course, surgery was not the only aspect of medicine in ancient times but it is the one which leaves the most obvious evidence both in the form of instruments and on the skeletons of those who have been treated. There are instruments from the basic kit,[313] and more, from Pompeii and, while the exact provenance of many of them is unknown, the

[311] See p.105ff.
[312] Bishop & Coulston (1993) 34.
[313] Jackson (1995) 193.

fact that they are there and were found in the Bay of Naples points to an area which may have had a high number of doctors, or indeed just a high number of people who practised medicine within their own *familia.* . The glass jars and bottles which would have contained medicines are unlikely to have survived the pyroclastic flows of the second stage of the eruption of Vesuvius while those in the *Domus* 'del chirurgo' in Rimini were melted by the fire which was hot enough to fuse the instruments together. There are some bronze medicine boxes but it is possible that there were far more glass bottles of medicine which have not survived. From the instruments we can say that every type of surgery which might be required appears to have been available and, this being the case, treatments for every kind of illness, from a headache to dysentery, are likely to have been on offer too.

While these conclusions tend, because of the nature of the material evidence being used, towards being inconclusive in some particulars, the information we do have can be compared to the direct counterparts found in the Roman Army. This comparison will inform in both directions with the conclusions from each of these chapters shedding some new light on the practice of medicine in the other context.

Where was medicine practised?

The problems with the recording of medical instruments from the Vesuvian towns has a direct effect on the identification of specific buildings where medicine was practised. Houses where medicine might have been practiced could only be identified by the presence of instruments since the Romans did not have civilian hospitals. These houses are unlikely to have any other distinguishing features. This can clearly be seen in the Domus 'del

chirurgo' in Rimini. There is nothing remarkable about the layout of the rooms of this house, nothing which might indicate that it was the house of a doctor. It is the instruments alone which have given it that designations. To a certain extent the same can be seen with the houses in Pompeii. Those which were thought to have yielded a number of medical instruments were given the tag 'of the surgeon'. However, since the provenance of many of the instruments is unknown and, where it has been found they appear to have come from houses other than those with the title 'of the surgeon' these identifications cannot be seen as reliable. With the debate about hospitals in Roman forts very much at the forefront of the study of Roman medicine at the moment it would be useful to be able to point, without any doubts about the identification, to specific buildings in Pompeii as having had medicine practised in them, for the purposes of comparison of the data. In the light of these problems of identification the importance of the *Domus* 'del chirurgo' in Rimini is clear.

Instruments were found in a number of houses: the House of the Surgeon VI 1, 9.10.23, Casa del Medico Nuovo (I) VIII 5, 24, Casa del Medico Nuovo (II) IX 9, 3-5, Casa del Medico dei Galdiatori V 5, 1.2, the House of M. Velusius Iuvencus I 10, 7, the Casa del Primo Piano I 11, 9.15, the House of Sutoria Primigenia I 13, 2, Casa di D. Octavius Quartio II 2, 2, Villa di Giulia Felice II 4, 1-12, and the House of Marcus Lucretius IX 3, 5.24,[314] where the finds included two scalpels[315] and a retractor[316] along with a cylindrical case and a bleeding cup.[317] When the location of this house is examined on a map it can clearly be seen that it is in very close proximity to the Central baths,

[314] Bliquez (1994) 97-98.
[315] ibid Nos.**20** & **26**.
[316] ibid No.**74**.
[317] ibid Nos.**308** & **13**.

literally across the road. This, combined with the definite provenance of the above instruments, leads to the conclusion that this doctor could have hoped to gather a, possibly large, proportion of his practice from the people going to the baths had they ever been finished.[318] In addition, what appears to be a side door of the house is diagonally opposite one of the entrances to the baths. Whether he could eventually have had some kind of practice actually in the baths or just worked from his home we cannot know. However, if he did indeed practice medicine, his house was large enough to suggest that he may have done well from it,since it took up over a quarter of the *insula*. It was not on a main road into the town so it is possible that his patients were local people. Künzl adds an extra dimension to the discussion of this house by pointing out that the owner of it, Marcus Lucretius is mentioned in a letter as having been *flamen Martius* and *decurio* both positions which suggest that he was not a doctor but rather that the instruments belonged to a member of his *familia*, a slave or freedman, who was the private doctor to the *familia.*[319] Whether this would have precluded him from having other patients as well we do not know but it would argue that he would not need to tout his art in the baths across the road once they had been finished.

Did Roman doctors actually practice in their own homes as Bliquez suggests? Horstmanshoff doesn't believe so[320] Harig also seems to go for a model where those who could afford to had the doctor come to them while those who could not afford this luxury had to go out to the doctor in his taberna to be

[318] Carrington (1936) 55-58.
[319] Künzl (1999) 582.
[320] Horstmanshoff in conversation.

seen.[321] Künzl seems to accept the idea that patients went to the doctor and not the other way around since he writes about the practice of medicine in specific houses.[322]

Ill.1 The House of Marcus Lucretius can be seen on this map, below the baths, although the doorways are not numbered. For a map with the doorways numbered see Ill.2.

[321] Harig (1971) 185-186.
[322] Künzl (1999) 578-584.

Ill.2 The House of Marcus Lucretius (IX 3, 5.25) can be seen below the baths. Unfortunately it is across the join of two maps, making it harder to see.

We do have to be careful with the placing of the Roman physician's place of practice in the baths. As Fagan points out, while baths are frequently prescribed as cures by Celsus and Galen, among others, and such cures are mentioned by Pliny the Elder, there is no actual evidence for the practice of medicine being an integral part of Roman baths.[323] The placing of statues of Hygeia and Asclepius in Roman baths cannot be understood to represent more than the promotion of the health-giving properties of the waters.[324] Fagan highlights that the question of whether physicians practised medicine at the baths is a difficult one. Instruments have been found in some bathhouses on the

[323] Fagan (2002) 86-88.
[324] ibid 88-90.

edges of the empire (Xanten, Gaul)[325] and the discovery of teeth in the baths at Caerleon really is not conclusive evidence for the practice of dentistry, there may just have been a fight.[326] In addition, the lack of references to physicians working in the baths in the written sources leaves the question open. Medical masseurs were known to work in the baths but were they physicians who would have dealt with more than just stiff muscles? Künzl points out that during the reign of Hadrian the baths in Rome were set aside for the sick at specific times.[327] While this is not proof in itself it would there is no reason why an enterprising doctor might not tap into this captive audience. However, as Künzl points out, this still leaves the question of what happened to patients who had been operated on at the baths since there is no provision for in-patient care in the baths. He comes to the conclusion that they must have been carried home afterwards.[328] The answer, for the time being, is that we just do not know and it could be argued either way.[329] A passing reference to hospitals in Celsus's *Prooemium*[330] is taken by Baker as evidence that there were civic hospitals:

> Again, those who take charge of large hospitals, because they cannot pay full attention to individuals, resort to these common characteristics[331]

However, I believe that it is a reference to the military hospitals which may, on occasion have treated civilians since it is possible that the doctors treated civilian patients.While the possibility of civilian hospitals cannot be entirely eliminated, there is no archaeological evidence for public buildings where medicine might have been practised to the extent that patients could have stayed once they had been treated and there are no other references in the literature.

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[325] Künzl (1986) 491-509.
[326] Fagan (2002) 90-91.
[327] Künzl (1986) 495.
[328] ibid 495.
[329] Fagan (2002) 90.
[330] Celsus *Prooemium* 65.
[331] Baker (2004) 88.

While shrines to Asclepius could be seen to have provided a service of this type, incubation was more about seeking advice from the god in a dream by sleeping in the temple[332] than by staying permanently in the shrine in the manner of an in-patient stay at hospital today. However, as Harig points out, there is some evidence for people spending some period of time near the shrine but this appears to have been in hostels or hotels, and in the case of Aelius Aristides with a priest,[333] not in buildings designed for the treatment of people.[334]

We also have to take into account that, since there were no civic hospitals in the ancient world, we are not quite sure where a physician would have carried out surgery, whereas in the army there is at least the possibility that there was a *valetudinarium* in the larger fortresses, but that also is the subject of debate.[335] There are two main possibilities: firstly, the patient's own house and, secondly, the physician's house. Fagan argues that the patient's house would not be ideal since it was probably small, badly lit, had no running water, and had many possible distractions for the physician. He then goes on to say that many people who lived in such accommodation would have been unable to afford a physician,[336] which is a valid point, but does not mention those who would have been better off and lived in some of the smaller atrium houses in Pompeii thus having not only the money to afford a physician, but also the space, light and water source (from the *impluvium* at the very least) for him to work. Galen certainly visited his patients in their homes, as noted by Horstmanshoff.[337] However, it is questionable whether the poor could have

[332] Nutton (2004) 103-104.
[333] Harig (1971) 181-182.
[334] ibid 181.
[335] See p.116ff.
[336] Fagan (2002) 91.
[337] Horstmanshoff (1995) 85.

afforded a doctor's visit or whether they would have been forced, or maybe have chosen, to go to a seller of cures in the market to treat themselves. Horstmanshoff states that people did not go to the doctor but that it was always the doctor visiting the patients,[338] an idea that we find slightly alien since now people go to their doctor and not the other way around. When Fagan was writing there was no definitive evidence for a physician practicing medicine in his own home. However, since then, Ralph Jackson has published the interim report on Rimini.[339] In Rimini the *Domus* 'del chirurgo' was discovered during improvement works on the Piazza Ferrari. This large house was richly decorated with mosaics and a polychrome glass wall panel, and had a hypocausted room on the ground floor. In the principal room of the *domus*, which had an Orpheus mosaic on the floor, and access from both the corridor and the *cubiculum,* over 150 instruments were found which had once been stored in bags and boxes on shelves and in cupboards on the north-eastern side of the room.[340] This large collection of instruments, which had been so carefully stored, shows that this room may have been a consulting room and surgery.[341] Jackson suggests that this could have been a practice where several physicians worked or that of just one man.[342] However, it is important to note that there are virtually no duplicates of instruments and all of them appear to have been carefully chosen in order to create as wide a selection of instruments as possible.[343] This evidence points to physicians in the Roman world

[338] Horstmanshoff in conversation.
[339] Jackson (2003).
[340] ibid 314.
[341] ibid 314.
[342] ibid 320.
[343] Jackson (2003) 321.

practicing in their own homes, but does not prove that they did not also practice in the homes of their patients or in the public baths.

Künzl's assessment of Bliquez's 1994 catalogue is a glowing one yet also raises some interesting points in relation to the practice of medicine in Pompeii. While some houses clearly were the base from which doctors went out and practiced, and may indeed have been where medicine was practiced, some of the richer ones are unlikely, in his estimation, to have been where the public went to see a doctor. He suggests, as mentioned above, that it is more likely that the instruments found in houses such as the Casa di Marco Lucrezio (IX 3, 5.24) belonged to a member of the *familia* who was the family's private doctor.[344] However, just because the principal occupant of the house was obviously well off and, in this case can be shown to have been *flamen Martis* and *decurio* does not mean that the member of the *familia*, Künzl suggests a freedman or slave,[345] who practiced medicine was not allowed to practice outside the family with the money earned going back into the family coffers.

As we can see from the above discussion, the question of where medicine was practised in the domestic context is almost as fraught as that of where it was practised in the army context, as we shall see in Chapter 3. To date only the *Domus* 'del chirurgo' in Rimini has definitely been identified as having had medicine practised there. Unfortunately, the way in which Pompeii was excavated means that it is difficult to identify with any certainty where instruments were found and, therefore, where medicine might have been practised, although there are some exceptions to this, most notably the Casa del

[344] Künzl (1999) 582
[345] ibid 582

Medico Nuovo II.[346] One thing which seems certain is that there were no civic hospitals in the way in which there were, in some cases, military hospitals since there is not only no mention of them in the literary sources but also no large public buildings of unidentified purpose have yet been found.

Conclusions

In many ways the practice of medicine in Roman times remains elusive. We have some of the instruments and we have at least one doctor's house but the details of what status these doctors had and how many people actually saw a doctor when they were ill is still unknown. Pompeii and Herculaneum have provided a vast quantity of data concerning the health of some of the population, and even more on the instruments which were available to the physicians when treating them for everything from fevers to broken bones. Unfortunately the storage of the archaeological evidence has been less than ideal and much of it has become confused. However, what we can determine is unique, since most of the other skeletal remains and medical instruments from the Roman world are from cemeteries. Pompeii and Herculaneum give us a cross-section of the population which had remained in the town, we don't just see the old and those who died from illness but also the young and those who have not yet even been born. The bones of these people tell us what kind of lives they led, what health problems they lived with and, in some cases, whether they had had the attention of a physician at some point in their lives.

What is interesting, and what can be studied with some success, is what the differences were in the medical care available to the public and that provided in the army and where that care was provided. What kinds of doctors

[346] Bliquez (1994) 84-86.

actually worked in the army, what level of healthcare was provided and what kind of problems were they faced with when working in the army? How does the material evidence for the practice of medicine in the army compare with that from the domestic context and what were the differences and similarities in the practice of medicine in these contexts? These questions will be examined in the following chapter.

3. Army Medicine

Introduction

The Roman army is the subject of extensive research, and has been for a long time with work ranging from that of Davies to Coulston. However, one area which has perhaps not had the attention that it deserves is the medical provision within the army.[347] In the army of the Principate the health of the lowest recruit was surely of paramount importance to the commanders and, ultimately, the Emperor.[348] That said, the idea that the health of even the lowest recruit needed to be fully maintained appears to be a modern argument from silence as opposed to one based on secure facts since it is rarely, if ever, stated explicitly in the surviving ancient texts. At most we have what Flavius Vegetius Renatus (Vegetius), who was writing around AD400, tells us should be the medical provision for the common soldier,[349] as examined below, along with the archaeological evidence for the practice of medicine in the Roman army. Modern medical provision for the army has meant that some kind of formal structure for the care of the health of soldiers while on the march and in permanent camps has, in the past, been expected but, as we shall see, this may not necessarily have been the case.

The problem with this is that, since today it would be unacceptable to send a fighting unit out into the field without full medical provision, assumption is that there will have been some kind of 'Roman Army Medical Corps' along the lines of the Royal Army Medical Corps (RAMC) of the British Army with which we are familiar. This association is so strong that the *Journal of the*

[347] Davies (1989) is the main source.
[348] ibid 209.
[349] Vegetius III.ii.

Royal Army Medical Corps actually had an article in 1964 entitled 'Medical Services of the Roman Army'.[350] Penn, who wrote it, had been a Captain in the RAMC. This explains both his interest and why this article was published in this journal but it also means that, more than many others, he will have been starting from the system of the modern army, with which he will have been familiar. Davies also starts from the position of the modern army when describing the way in which hospitals were managed and he refers to them being run by an NCO (Non-Commissioned Officer).[351] While it appears that the hospitals in Roman forts were run by orderlies and not doctors,[352] using modern terminology and acronyms immediately creates a link in the mind of the reader between the ancient and the modern which should be discouraged as it can distort the interpretation of the evidence for medicine in the Roman army, as we shall see below in relation to hospitals. Thus, we need to be careful not to be anachronistic in our approach to medicine in the Roman army.

This chapter will be divided into four sections. Firstly, I will make a brief survey of the level of healthcare in the Roman army, and the type of problems faced by the army as distinct from the urban domestic. I will briefly examine the diet of the army as this will have been a major factor in the general levels of health of the soldiers. Secondly, I will examine the number and status of doctors in the Roman army and what we can learn about them and their place in the army from the inscriptions, which are our main source for their presence in the army, along with the writings of Vegetius.[353] Thirdly, the instruments found in Roman forts will be examined, looking at what types have been found,

[350] Penn (1964).
[351] Davies (1971) 774.
[352] Davies (1985) 212.
[353] Vegetius III 2.

where they have been found within the forts and what this can tell us about the practice of medicine in these forts. A case study will be made of the instruments found at two forts, the legionary fortress at Neuss *(Novaesium)* in Germania Inferior and the auxiliary fort at Housesteads *(Verocovicium)* on Hadrian's Wall, to see what we can learn from them about the practice of medicine at these two sites in particular. Finally, the question of *valetudinaria* (hospitals) in Roman forts will be examined closely with particular reference to the fort at Wallsend and the fortress at Novae, and I will be arguing that there is an intermediate argument between the two extremes of the debate on the identification of specific buildings as *valetudinaria.* Namely that each building must be examined and identified on its own merits and not simply because it fits a ground-plan which was first identified as such by anachronistic expectations.[354] Throughout I will be comparing the evidence for medical practice in the army with that from the urban domestic sphere and making a preliminary survey of the conclusions which can be drawn from this comparison. The main question which is being asked throughout this section is whether medicine in the army was any different from that in the urban domestic sphere in the kind of conditions or injuries which might arise, the organisation of the doctors themselves and the instruments used?

Health, Nutrition and the Problems Faced by the Roman Army

The Roman army was a fighting force and the health of the soldiers will have directly affected the ability of the army to perform in battle as well as in the carrying out of their peace-time duties. We see the army looking to recruit fit, healthy young men and not those who would be constantly sick and possibly

[354] Baker (2004) 113.

even affect the health of the whole garrison in the physical examination of army recruits as described by Vegetius, writing about AD 400. He provides details of the qualities which were to be looked for in a recruit:

> The recruiting officer should diligently ensure that through a careful examination of their face, eyes and physical constitution, he chooses men who are likely to prove good soldiers. For the qualities, not only of a man but also of horses and dogs are revealed by many indications...The potential young recruit therefore ought to have alert eyes, should carry his head erect, have a broad chest, muscular shoulders, strong arms, long fingers, a small waist, slim buttocks, and legs and feet which are not fleshy but sinewy and strong. When you find all these indications in a recruit, you need not pay too much attention to his height, for brave soldiers are more valuable than tall ones. [355]

Thus, we see that only men who were fit and healthy would have been allowed into the army. It appears that those who were overweight and weak with bad eyes would not have been allowed in.

The mention of the eyes is interesting in the light of Vindolanda Tablet 154 which separates those who are ill from those with eye problems in the list of those not fit for duty.[356] With conditions such as conjunctivitis widespread due to the close, and not necessarily clean, living conditions of the majority of the population this would have been an important consideration, especially as the soldiers themselves lived in close quarters in the barracks. One new recruit with an eye infection could quickly infect the rest of his barrack block. In addition, a soldier with bad eyesight would be a liability, not only to himself, but also to his fellow soldiers in battle and when the army was on the move through hostile country. As Vegetius was writing around AD 400 it is possible that the reference to height is addressing Valentinian's decree of AD 367, which set down a minimum height for army recruits of 5ft. 7in.,[357] directly. He could be seen to be arguing that, as long as the recruits were fit and in good health, their

[355] Vegetius I.4.
[356] Bowman & Thomas (1994) 90-98.
[357] Theodosian Code 7.13.3.

height was immaterial since it was not itself an indicator of good health, although it can have indicated a good diet when young, as we have seen in Chapter 2. This minimum height may not seem tall to us but Garnsey speculates that this was probably at the top of the range for the rural population from which the army was traditionally drawn.[358] We have seen in Chapter 2 that the average male height in Herculaneum was 5 ft. 6in.,[359] which implies that a large number of the population of Herculaneum at least would have been unable to join the army. This further suggests that the army might have been drawn predominantly from the rural population putting the diet of the army in contrast to the urban diet examined in the previous chapter. However, it must be noted that river patrol troops did not have to be as tall as the field army.[360] Davies seems to be happy taking Vegetius at face value and states that he is the source for the official attitude to hygiene, diet and exercise,[361] but Goldsworthy is far more sceptical, stating that Vegetius is an ideal, not a set standard.[362] Certainly it is likely that when the army was low in numbers those who might not otherwise have been accepted may have been allowed to join, including those who did not make Valentinian's height restriction.

A career in the army would have been most attractive to the poorest of Rome's citizens as it provided a roof, steady diet, income in coin and, perhaps, a sense of purpose. However, if the "medical" was as strict as Vegetius would have us believe, the poorest people would be unable to join since their poor diet is likely to have adversely affected their potential height. There were, of course,

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[358] Garnsey (1999) 59.
[359] See p.18.
[360] Theodosian Code 7.22.8, Garnsey (1999) 59 n.34 has 'frontier troops' instead of 'river patrol troops'.
[361] Davies (1989) 209.
[362] Goldsworthy (1996) 29.

negative aspects to being in the army. Soldiers could not contract a legal marriage, although Goldsworthy points out that this seems to have frequently been ignored,[363] they could be killed or maimed in battle, or by disease, and they were subject to the brutal army discipline. This latter was probably the reason for the high level of desertion in the army.[364] Being in the army had the same health risks as living in a Roman town, and some additional ones too. While there were incentives to join the army there were also disincentives. In addition, there was the chance of not passing the medical and not being allowed to join the army in the first place. Davies recounts the case of a recruit named Tryphon who was discharged in AD52 because he failed the eye-test. He suffered from 'weak eyesight caused by a cataract'.[365] It seems that the eye test was carried out three times as the phrase, 'the examination was conducted at Alexandria' was written three times at the end of the document, presumably by the three doctors who carried out the test.[366]

Once in the army it was not guaranteed that the soldier would make it to the end of the twenty-five years he had signed up for. In the first four months of training anyone who was not satisfactory could be summarily discharged. Any soldier who was seriously wounded, or too ill or weak to continue in service was invalided out of the army *(causaria misso)* but he still received the rewards which he would have had after serving the full twenty-five years.[367] However, those who could return to service would have been treated by the doctor and returned to active duties once they were well again or their wounds had healed.

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[363] Goldsworthy (1996) 30.
[364] ibid 29-30.
[365] Davies (1989) 227.
[366] ibid 227.
[367] ibid 227.

The diet of the Roman army was similar to that of civilians,[368] the main difference being that in the army a basic level of nutrition was more likely to be maintained while the poorest members of Roman society would not always have known where their next meal was coming from. Garnsey describes the army as,

> a sub-elite class, distinct both from the elite and the mass of the people.[369]

The basic diet of Roman soldiers was, bread made from wheat, bacon, cheese, vegetables, sour wine *(acetum)*, salt and olive oil.[370] This was paid for by a standard deduction *(ad victum)* from the soldier's pay and anything else that they wanted to eat had to either be paid for from their own money or, in the case of wild animals, hunted in the vicinity of the fort.[371]

Davies refutes the view that the armies of Julius Caesar and the early Principate lived on corn and only ate meat when they were forced to by starvation. The reliance on grain, he points out, was forced by the difficulties in getting fresh meat and vegetables for an army on the move.[372] Goldsworthy notes that the smallest daily issue of food per soldier was: three pounds of bread, one pound of meat, two pints of water and a tenth of a pint of oil per day.[373] This may not seem like much but when a legion arrived in an area the amount of food required for the men alone will have been a logistical nightmare. Goldsworthy states that 5,000 men would need around 100 bushels of corn per day if they were harvesting ripe corn and, assuming that the average field yield in Northern Britain was 10 bushels an acre, a legion of 5,000 men

[368] Davies (1989) 202, see above p. 16ff.
[369] Garnsey (1999) 115, Davies (1989) 188.
[370] ibid 125.
[371] Davies (1989) 188.
[372] ibid 203.
[373] Goldsworthy (1996) 291.

would consume the produce of 70 acres in a week.[374] For the meat ration a legion of 5,000 men would have consumed 12.5 oxen, 120 sheep or 38 pigs every day.[375] This is a huge amount of food and it illustrates just how much of an impact the arrival of the army in an area for the first time might have had on the local food supplies. Antony King notes in his 1991 article that initially it appears that the Roman army in Britain ate a very similar diet to the local people but that this then changed as the army became settled and established their food supply.[376] Garnsey notes that Galen states that the army took barley-meal with them on campaign in the 'good old days' but whether this was just a myth or fact cannot be established. What is known is that barley bread was a punishment for a Roman legion which was in disgrace, if, of course, it managed to escape decimation,[377] since barley was usually for the animals. Johnson notes that the grain issued to the soldiers was milled and made into bread, soup, pasta or porridge.[378] Pliny the Elder informs us that *panis militaris* was a wholemeal bread[379] and, according to Davies, Vopiscus states that there were two sorts of army bread, the *panes militares castrenses* which was the 'normal' bread and the *panes militares mundos* which was of a higher quality and may have been for the officers.[380] The grain for the army had to come from somewhere and it was secured mainly by requisition from civilian sources and from the land around the forts which was owned or leased by the army itself, the *prata* or *vivarium.*[381] The cereals found at military sites include; wheat, barley,

[374] Goldsworthy (1996) 291-292.
[375] ibid 291-292.
[376] King (1991) 16.
[377] Garnsey (1999) 120.
[378] Johnson (1983) 195, Davies (1989) 191.
[379] Pliny 18.67.
[380] Davies (1989) 191.
[381] Johnson (1983) 195, Davies (1989) 187-188.

oats, rye spelt and various grasses.[382] Most of these would have been used as animal fodder with only the wheat, and occasionally the barley, being used for human consumption. Thus it seems that the army might well have been eating bread made from reasonably high quality flour and, therefore, would not have suffered from the problems associated with phytate-rich flour which have been discussed in Chapter 2.[383] Thus, even at the basic level of grain and bread it appears that the army were probably better off than many of the people in Roman towns who lived on a much poorer quality of bread and whose health suffered as a result.

The meat would have been either freshly slaughtered, the army carried a lot of its meat 'on the hoof' as this was the easiest way for it to be transported, or salted and dried. The former was more common in Britain while the latter was most common in Egypt, this being influenced by the climates since live animals would not fare well in Egypt but would be fine in the temperate climate of Britain.[384] There were various sources of meat. It could be requisitioned from the provincials, purchased, hunted, come from the stock kept in the *prata* or *vivarium* around the forts or come from the regular sacrifices to the gods.[385] The soldiers appear to have frequently hunted the local wildlife, as the excavation of forts in Britain has revealed that they ate deer and wild boar in addition to ox, sheep, goat and pig which were probably part of the regular rations handed out in the fort.[386] Indeed, Polybius even mentions an area exclusively for cattle in his description of the camp.[387] Antony King's analysis

[382] Davies (1989) 199.
[383] See p.20.
[384] Garnsey (1999) 17.
[385] Davies (1989) 191.
[386] ibid 193.
[387] Polybius VI 31.13-14.

of the bones found at various military sites points to a difference in the type of meat consumed by the soldiers in auxiliary forts to those in the legionary fortresses. The latter ate more pork than the former.[388] The deer and wild boar will have been hunted locally not only for food but also for sport. The soldiers stationed in Britain, the Rhineland and the Danubian provinces did better than those stationed elsewhere in this respect.[389] In addition to red meat poultry was probably a regular part of the military diet with evidence for the eating of chicken, goose, duck and a large number of other birds.[390] Meat was usually either roasted or boiled.[391] For the poor meat would have been a rare addition to their diet and it is unlikely that even those who could afford it had access to such a wide range of meat, in particular game in the urban environment.

Seafood was popular, in particular shellfish, as we have seen from the analysis of the bones of the people from Herculaneum this was also the case, at least among coastal populations.[392] Obviously the units on the coast had access to shellfish but it was also sent considerable distances inland to places such as Brecon and Chesters.[393] King notes that the consumption of oysters in particular shows a marked increase after the Roman invasion. There is little evidence for them being eaten before this, even on the south coast where they were common at this time. From the early Roman period they become quite common, at first on the coast but then further inland.[394] Seafood was not the only item which travelled long distances to the army. The Roman army was supplied from across the empire with items including black olives, beans, honey

[388] King (1984) 189.
[389] Garnsey (1999) 126.
[390] Davies (1989) 195.
[391] ibid 193.
[392] Bisel & Bisel (2002) 458.
[393] Davies (1989) 193-194.
[394] King (1991) 17.

(which was used as a sweetener) and fish sauce.[395] The cheese for the troops in at least some cases would have come from the their own livestock, as is shown by the cheese presses found at a number of military sites. Due to the supplies from other parts of the Empire, in some places the soldiers probably ate better than the locals.[396] Those living by the sea, as we have seen, appear to have eaten a lot of seafood and this will have been because it was cheap and readily available.[397]

In addition the soldiers appear to have eaten a large variety of fruit and nuts. These were among the few items which they were allowed to carry off while on campaign and are even mentioned in the military oath as *porna pabulum*, fruit for food. The variety of stones and kernels recovered from military sites include; apples, pears, plums, cherries, peaches, grapes, elderberries, sweet chestnuts, walnuts, hazelnuts, beechnuts, olives, apricots, dates, damsons, blackberries, strawberries and sloes.[398] A number of these would have been picked in the countryside around the forts when they were in season as they would not travel well. The cultivated varieties were most likely bought from the locals or came from the land belonging to the army around the fort. This kind of food is unlikely to have been available to the poor in the cities of the Roman Empire. The vegetables they ate appear to have been less varied and included; beans, lentils, peas, carrots and cabbage. However, this apparent disparity may well have been due to the evidence that these leave in the archaeological record being less identifiable than the pips and stones of fruit and nuts. Of this list the first two were the most common, probably because they

[395] Davies (1989)195-198.
[396] ibid 203.
[397] See p.21.
[398] Davies (1989) 197-198.

store well.[399] It is interesting to note in connection with the Roman army diet that, as Davies points out, there is only one recorded case of scurvy in the Roman army[400] and that there is no recorded complaint about the Roman military diet.[401] The fruit, nuts and vegetables will all have been important sources of vitamins and key in the prevention of deficiency diseases, such as scurvy, although they may well have been unaware of the direct connection. Vegetables are more likely to have featured on the menu for the poor but it is unlikely that they had them in the same quantities as the army.

When on campaign the bread was often replaced by biscuit *(bucellatum)* and the wine by sour wine *(acetum).*[402] Josephus claimed that soldiers each carried three days' bread ration with them when on the move along with a sickle to reap crops[403] but Goldsworthy suggests that more would have been carried in the baggage train.[404] Johnson disagrees on the subject of the wine, stating that the sour wine *(acetum)* was drunk by the common soldiers, who watered it down to form a drink called *posca,* while the vintage wine *(vinum)* was drunk by the officers.[405] This does seem more likely. On a list of food and drink from Vindolanda Celtic beer *(cervesa)* is also listed.[406] Johnson states that it has been calculated that each soldier needed two and a half litres of water per day (nearly four and a half pints) for drinking and cooking, while Goldsworthy states that they needed two pints.[407] This is a significant difference and may be due to the different requirements for different climates. Whichever figure is correct there

[399] Davies (1989) 199.
[400] ibid 203.
[401] ibid 206.
[402] Goldsworthy (1996) 287.
[403] Davies (1989) 203.
[404] Goldsworthy (1996) 291.
[405] Johnson (1983) 196.
[406] ibid 196.
[407] ibid 202.

can be no doubt that the army required large amounts of fresh water, especially when the water needed for pack mules and cavalry, not to mention bathhouses, latrines, workshops and the commander's house, is taken into account. The source could be a spring, wells or aqueducts but it had to be plentiful and clean.[408] In the cities water was supplied either by aqueducts or by wells and the poor would have had to go to the nearest well or fountain to get water since only the rich could afford to have running water in their houses. The wine which the poor drank will have been of poor quality, if they could afford to drink wine at all.

Vegetius advocates a high level of individual cleanliness for the soldiers[409] and a programme of exercise for all soldiers, even the veterans, in order that they be kept physically fit.[410] This programme involved exercises each morning for the veterans and each morning and afternoon for the recruits.[411] Davies also states that they went on twenty-mile route marches three times a month and periodically went on manoeuvres, although he does not cite his source for this information.[412] Vegetius states that some forts had drill halls in order that the soldiers could continue training even in bad weather.[413] Maintaining fitness had two effects, firstly, they were able to deal with whatever challenges arose when far from home and, secondly, people who are fit and healthy are less susceptible to disease. When compared to the people from the Vesuvian towns the soldiers were very well off. Their good diet and regular exercise meant their immune systems would be well able to cope with any

[408] Johnson (1983) 202.
[409] Vegetius II.9; II.12; II.14.
[410] ibid II.23.
[411] ibid II.23.
[412] Davies (1989) 214.
[413] Vegetius II.23.

illnesses which they might encounter. While they trained hard they will not have been overworked in the way that slaves and the very poor were.[414] However, the Roman soldiers at various times are likely to have been involved in building projects varying from the building and maintaining of roads and drains to mining and quarrying materials.[415] These activities are bound to have produced injuries including, but not exclusively, strained muscles, cuts, abrasions and broken bones. Vindolanda Tablet 155 refers to the building of a *valetudinarium* while 156 refers to the building of a guest-house or residence.[416]

The army faced a number of challenges while away on service. Fighting in unknown terrain in what would have seemed like the hostile climates of northern Europe would have had a serious effect on morale and the near-defeat of the first expedition to Britain, described by Caesar in his Commentary on the Gallic War, would have had a major impact on the morale of the troops.[417]

Being in an unfamiliar country with a climate which may have been significantly different from the one to which they were accustomed had its dangers. Unfamiliar food could play havoc with the health of the soldiers, as could unpredictable water supplies and, at a very basic level, homesickness could have had a major impact on the morale of a legion. Men with low morale would have been more open to disease as depression lowers the immune system.

In relation to the above discussion it is important to keep in mind that the Roman army did not consist of equally sized legions. Goldsworthy's description of the basic units of the Roman army underlines this.[418] The

[414] See p.20ff.
[415] Davies (1989) 63-65.
[416] Bowman & Thomas (1994) 98-101.
[417] Caesar *Gallic Wars* IV 23-26.
[418] Goldsworthy (1996) 14-16.

Centuries in the first Cohort were larger than those of the second to tenth for no reason that we know of and many legions appear to have been short of numbers at various points.[419] This would have had an impact on the amount of food needed, the size of the forts and the level of medical provision required, for example, the number ofmedical personnel.

The health of the army, therefore, should have been reasonably good with those who were unfit for service not passing the medical and the food being reasonably varied and high in nutrients. However, we have to be aware that this may not always have been the case. There were the dangers associated with being in a different place and not having any immunity to the local diseases and the toll that long marches with packs and the work involved in pitching camp would have taken. For those who came from the poorer levels of society there was the appeal of a good diet and regular meals as well as the pay. They may well have been better off in the army despite the limitations on marriage and the possibility of not returning home. Compared to the urban poor the army were, it seems, on the whole well fed with a varied diet which ensured that they were properly nourished. Their active lifestyle will have left its mark on their skeletons (see below) but they had a chance of being healthier than the average person in a Roman city.

These conclusions are borne out by Erc26 from Herculaneum. This man was undoubtedly a soldier as he was found on the beachfront at Herculaneum with his bronze military belt and sword. In addition, he was carrying woodworking tools, an adze and three chisels, on his back,[420] indicating that he may well have been involved in building work. He was tall (174.5cm or

[419] Goldsworthy (1996) 21-23.
[420] Gore (1984) 572-573.

5ft.8in.), tough and well-exercised. His long bones are above average roundness indicating that he had a good diet and was active. He spent much of his career on horseback and this had enlarged the attachments for the muscles in his knees on both sides. The army lifestyle had left its mark in the form of six missing teeth, three molars most likely to decay and three incisors to trauma, possibly in a fight, perhaps evidence of some kind of basis for the mistrust of Roman soldiers by the locals.[421] He had also received a stab wound to his left thigh. This had left a vertical mark on the bone but had healed fully and allowed full function of the leg.[422] This was lucky as a horizontal cut would have permanently affected the functioning of the muscle. Whether this had happened in battle or just a bar fight cannot be known but he is an example of what we might expect a Roman solider to look like; healthy with some marks from his profession on his skeleton.

Medical Personnel in the Army

There are a number of inscriptions which refer to, or were set up by, medical personnel connected to the army.[423] Nutton states that there would have been a variety of medical personnel in the army, with each legion having several doctors, possibly as many as one for each detachment *(vexillatio).* Each auxiliary regiment had its own doctor who appears not to have been a soldier.[424] Where there was a hospital it was run by one or two non-medical administrative officers. Vegetius states that the *praefectus castrorum* (prefect of the camp), who was the second-in-command of the legion and the senior professional

[421] Goldsworthy (1996) 29-30.
[422] Bisel & Bisel (2002) 468.
[423] E.g. Anicius Ingenuus at Housesteads CIL 7.690 in Campbell (1994) 104.
[424] Nutton (2004) 181.

officer was responsible for the logistics and medical organisation.[425] There was a hierarchy of doctors within the army and there are two inscriptions which record doctors as being 'Camp Doctor'. It is possible that this was the title given to the senior doctor in a legionary fortress but this is not proven, like so many other things in relation to this aspect of the Roman army.[426] It does seem that this title was given to a doctor near, if not at the top, of the hierarchy of doctors in the army. At the other end of the scale were the bandagers *(capsarii)*, drug dispensers, vets and recruits who were learning their speciality.[427] Since Nutton draws his conclusions here from the scant epigraphic evidence for doctors in the army, from which very little can be extrapolated, for the time being his conclusions appear to be the only sensible ones. In an earlier article Nutton examines the different titles which are found on tombstones, and, in particular, the title *miles medicus.* He takes the line that, since the title *miles medicus* is found only on private tombstones, it is the designation of a doctor who was in the army and may even have trained in the army after entering as an ordinary soldier.[428] The title, by this interpretation, was not a military one but one used in civilian life, and death, as a defining feature of what these men were in life.

Davies goes into more detail on the ranks of doctors in the army. In addition to the *praefectus castrorum* mentioned above he looks to the list of *immunes,* those exempt from normal duties, in the *Digest* where he finds mention of the *optio valetudinarii* (those in charge of running the hospital), *medici* (doctors), *capsarii* (bandagers), *qui aegris praesto sunt* (those who help

[425] Vegetius II.10.
[426] Nutton (2004) 181.
[427] ibid 181.
[428] ibid 268.

the sick) and *veterinarii* (vets).[429] An inscription from Lambaesis of about AD198 or 199 lists two *optiones valetudinarii, librarius* (secretary) and *discentes capsariorum* (a trainee bandager) among others. A distinction is made between the *praefectus castrorum* and the *optio valetudinarium.* While the former had overall charge of medicine for the legion the latter was specifically in charge of running the hospital.[430] The *capsarii* were so called because of the round box, or *capsa,* in which they carried bandages and dressings. The inscription is important as it shows that the army gave at least some kind of training to those who attended to the sick, with the reference to *discentes capsariorum.*[431] However, I think that Davies extrapolates far too much from this. He says, 'It is quite clear that the medical staff at all levels were highly trained,'[432] and again later, 'the medical staff were well-trained...'.[433] This appears to be an over-simplification. Nutton is far more conservative suggesting that if some kind of training was provided for the *capsarii* thent there was some medical instruction available for the *medici.* However, whether they were 'highly trained' or even just 'well trained' is unknown. There were no training standards for doctors in the ancient world that we know of and, therefore, what constituted the training for a *capsarius* is unknown, if there even was a standard which had to be attained. Davies also uses the scene from Trajan's column, which shows two injured soldiers being attended to by other soldiers, one of whom is wielding a bandage so could well be a *capsarius,* as secure evidence for the proficiency of the *capsarii* and medical orderlies.[434]

[429] Davies (1989) 212.
[430] ibid 212.
[431] ibid 212.
[432] ibid 212.
[433] ibid 213.
[434] ibid 213.

Other research into the depictions of the army on Trajan's column have shown that they are not necessarily accurate and, therefore, must be treated with due care when being used as a source.[435] Interestingly, Vindolanda Tablet 156 mentions a medical orderly being sent with builders to build a 'residence'.[436] Whether this was a residence for an officer or a guest house is not clear but it appears that the medical orderly is in charge of the building work, indicating that he was not a medical orderly to the exclusion of other duties when they were required of him. In addition,Vindolanda Tablet 586 refers to a pharmacist in the context of supplies. Bowman and Thomas suggest that Vitalis may have been a medical orderly and, thus, a member of the unit.[437] This title implies a specific role within the medical staff which would require specialist knowledge of herbs and plants. It seems that medicines were certainly being made in the vicinity of the fortress as tablet 294, a letter from Paterna(?) to Lepidina, seems to refer to medicine for fever.[438]

The question of what rank doctors held, and what their status was, is one to which there is no simple answer. It seems that some doctors joined the army for a time and then returned to civilian life.[439] They did not enlist for twenty or twenty-five years like the usual recruits and came from families of higher status than those of the ordinary soldiers. It also appears from the answer to an appeal made by Numisius to Antoninus,[440] that they were exempt from civic duties

[435] Lepper & Frere (1988) 266ff.
[436] Bowman & Thomas (1994) 100-101.
[437] Bowman & Thomas (2003) 38-39.
[438] Bowman & Thomas (1994) 263-264.
[439] Nutton (2004) 182.
[440] CJ10.53(52). 1, 3rd C. AD in Campbell (1994) 104.

while on service with the army, and were able to keep their immunity from tax to which they were accustomed.[441] The text runs as follows:

> The Emperor Antoninus to Numisius. Since you say that you are doctor of Legion II Adiutrix, you will not be forced to undertake civic duties during the time when you are absent on state business. But when you have ceased to be absent (on state business), after the termination of your exemption on that basis, if you belong to that group to whom are applicable the privileges granted to doctors, you will benefit from that exemption.[442]

The 'state business' is presumably Numisius' work in the army and it seems that he was being requested to take on civic duties while he was away, though what these might have been is unknown. Perhaps he was or high enough status in his local community that he was expected to pay for the local games?[443] The mention of privileges in the last line is most likely a reference to the decree from 30BC, of which we have fragmentary remains, which provides evidence that doctors not only had a degree of tax immunity but were also exempt from being called up for the army.[444] These privileges are known from a number of sources and are even referred to in Lucian.[445] This letter from the emperor to a doctor shows us that a doctor could decide to work in the army for a set period of time but was exempt from being called up to serve in the army as an ordinary soldier. However, the existence of this letter calls into question whether this was a frequent occurrence. Why else would the Emperor be asked to mediate on this issue unless it was an exceptional case? If this is so then this cannot be taken as evidence for this being a common occurrence.

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[441] Nutton (2004) 181.
[442] CJ10.53(52). 1, 3rd C. AD in Campbell (1994) 104.
[443] Pleket (1995) 30-31.
[444] Nutton (2004) 249.
[445] Lucian *Disowned* V 23.

The question of the status of doctors in the ancient world is a tricky one and, as we have seen, there is a great deal of uncertainty about the status of doctors in the domestic sphere. Pleket comes to the conclusion that, while there may have been a few doctors who belonged to the elite, the majority of doctors appear to have belonged to the equivalent of the upper middle class, being somewhat below the elite but not part of the great mass of the plebs and this seems to be the logical conclusion from the evidence we have.[446] However, Nutton points out that it took little for a doctor to move down to the level of travelling salesmen and was only a precarious member of the middle class.[447] The difference with the army is that we get a slightly clearer picture of how the ranks were organised and what these differences in status may have meant for the doctors themselves.

All military doctors *(medici)* were technically exempt from normal military fatigue duties and were also eligible for a higher rate of pay.[448] Nutton points out that naval doctors were regularly paid at double the rate of the crewmen so it is reasonable to assume that pay and a half or double pay was standard for the 'soldier doctors' who seem to have been enlisted men who gained their training and experience in the army itself instead of in civilian life.[449] However, there were also *medici ordinarii* whose title implies membership of the *ordo* of centurions which would have entitled them to at least ten times the pay of the ordinary soldier.[450] This might be taken to imply that there were different ranks of doctor within the army, much in the same way

[446] Pleket (1995) 27-33.
[447] Nutton (2004) 254.
[448] ibid 181.
[449] Nutton (2004) 181.
[450] Nutton (2004) 181.

as there were different ranks of soldier, and that their pay would have reflected these different ranks and responsibilities.

The different ranks would most likely have reflected the different levels of expertise, from those who had only started training in the army to those who came into the army as fully fledged doctors with a number of years' experience in civilian life. However, that is not to say that the most experienced doctors were older men who might not be able to keep up with the army when it was on the march towards battle. The inscription in honour of Anicius Ingenuus from *Vercovicium* (Housesteads) on Hadrian's Wall gives him the title of *medicus ordinarius* yet he was only twenty-five years old.

> To the spirits of the departed, in honour of Anicius Ingenuus, doctor *ordinarius* of the first cohort of Tungrians, lived twenty-five years.[451]

It may at first seem surprising, that one so young could have reached such a high rank. However, it is most likely that Anicius Ingenuus first started his training at a young age, possibly when he was only about twelve years old, although more likely when he was about fifteen or sixteen years old and started the transition from childhood to adulthood.[452]

What would have been the incentives for a healer to leave a safe, civilian practice and go to work for the army? As noted above, the pay for a military *medicus* was higher than that of the ordinary soldier and it is not unreasonable to assume that this financial incentive drew in a number of doctors who wished to make a good sum of money in a reasonably short space of time. Another reason would have been to gain experience. Where else could a young doctor

[451] CIL 7.690 in Campbell (1994) 104.
[452] Harlow & Laurence (2002) 65.

hope to learn about the treatment of, not only wounds, but also the day-to-day ailments which affect people who are living in close quarters, such as eye diseases like conjunctivitis? It is to be remembered that Vindolanda tablet 154 tells us that for the thirty-one men unfit for duty only six were injured, fifteen were ill and ten were suffering from eye problems.[453] It is an indicator of how prevalent eye problems were that they were a separate category on the list of those unfit for duty. Another major advantage for the doctor who decided to work in the army was that it appears that the army supplied at least some of the materials necessary for the treatment of the sick and wounded, for example the barrels for what was probably medicated wine found at Aquincum, near Budapest which were tax free because they were for the hospital of the 2nd Adiutrix Legion.[454] So the doctor incurred no personal expense in treating the patient and was guaranteed his pay. Thus, his income was more secure than it would be in a civilian practice where he would probably initially pay for the drugs and bandages and might not be paid by the patient at all, particularly if the patient died and he was blamed by the relatives for the death. In addition, the potential opportunities for studying internal anatomy,[455] either from the wounds of the soldiers he was treating or from the cadavers of enemies left on the battlefield, could only be seen as an advantage in a time when the dissection of corpses was frowned upon. The drawback was that the doctor could well be working far from his home and family and there was the risk that he would be killed, severely wounded or die from disease while working in enemy territory, although disease was a risk in civilian life too.

[453] Bowman & Thomas (1994) 90-98.
[454] Nutton (2004) 179.
[455] Jackson (1988) 129.

Of particular interest, not only in relation to the doctors but also to the instruments and buildings associated with medicine in Roman forts, is that it is probable that the majority of the work carried out by the doctors at base would have been the treatment of illness and not wounds, except in the aftermath of a skirmish or battle. Vindolanda tablet 154, as discussed above, backs this up with the majority of those off duty being sick, not injured. Interestingly, this is not something to which much attention has been paid. The descriptions of medicine in the Roman army have tended to focus on the treatment of wounds. Webster's account is an example of this.[456] He even goes so far as to say, '...the medical service was organised to deal mainly with casualties.'[457] Salazar's account in *The Treatment of War Wounds in Graeco-Roman Antiquity* has an obvious bias from the start.[458] She is bound to be preoccupied with the treatment of wounds over that of disease because of the very nature of her book. The obvious difference between doctors in the army and those in the domestic context is that they were working within a far more structured framework with ranks equivalent to those of the soldiers, even if the doctor was only in the army for a short time. In addition, there was far less financial risk for the doctor himself since he did not have to pay for bandages and medicines in the first instance as these appear to have been paid for by the army.[459] This meant that if the patient died the doctor was less likely to be left out of pocket. It is possible that each solider was charged for the medicines and bandages used on him, in the same way that they were charged for food but there is no evidence for how these items were ultimately paid for. Of course, this benefit was offset by the

[456] Webster (1969) 252-254.
[457] ibid 252.
[458] Salazar (2000).
[459] Dyczek (2002) 686-687.

possibility of travelling into hostile countries and being in personal danger while working for the army on the frontiers of the Empire.

Instruments

Relatively few instruments have been found in Roman forts and camps. When placed alongside those from the Vesuvian towns and Rimini there seem to be few indeed. This is mainly because of the Roman army's methodical clearing of any site which they had occupied in order to leave nothing of value, either materially or by way of shelter, which could be used by their enemies.[460] Those instruments which do survive are not unproblematic. A quick glance at Appendices Four to Ten in Baker shows that most of them could also be toilet items and might have nothing to do with medicine at all.[461] There are some conclusive types, such as scalpels, which had a solely medical function but these are heavily outnumbered by the types which could be either toilet or medical in function. In addition, the instruments tend to appear in clusters in different areas of the fortress with a smaller number of individual finds. This could imply the deliberate deposition of these instruments when leaving the fort or specific areas of storage.[462]

Since the army tended to take everything with them when they left a base what remains is what was either lost, or deliberately left behind, either in anticipation of returning at some point in the future,[463] or because it simply could not be carried. The idea that items were lost is refuted strongly by Bishop and Coulston,[464] The instruments were probably in clusters because they were seen as scrap metal and thus were stored together. The reason they were left

[460] Bishop & Coulston (1993) 34.
[461] Baker (2002) 146-186.
[462] Baker (2004) 76-77, Bishop and Coulston (1993) 34-35.
[463] Bishop & Coulston (1993) 34-35.
[464] See below for a summary of their arguments.

may be because they were broken or not needed, although it is hard to imagine that they would be left for the latter reason. If the army had to march through hostile country they would not want to burden themselves with items which could not be used. Bishop and Coulston point out that there is increasing evidence that these items had been kept in order that the metal in them could be recycled. This makes sense as the mining and purifying of metal was labour-intensive and took time, particularly if the nearest source of a particular metal was in another country, as was the case with zinc in Roman Britain – the nearest source was Aachen in Germania Inferior.[465]

Baker opens up the debate about the deposition of instruments by suggesting that, instead of having been either lost or deliberately left behind when a site was being cleared, these instruments, in particular those from the Corbridge Hoard, may have been deliberately deposited for ritual purposes.[466] She points out that the body and items associated with it were highly symbolic and it is possible that instruments, having been associated with the body were deliberately deposited because of its association with a specific person or sick body. She argues that they may have been deposited because of an association with an unsuccessful operation or a dead or even unsuccessful doctor.[467] While this is a possibility, the explanation of 'ritual' is an easy fall-back solution to the question of why the instruments were left there and, if instruments were deposited, either singly or in larger groups, why have we not found them in forts and fortresses? Additionally, it would seem to be a waste of materials and economically not viable for a doctor to dispose of his instruments every time there was a negative association. He could soon find himself out of pocket.

[465] Bishop & Coulston (1993) 35.
[466] Baker (2004) 74.
[467] Baker (2004) 75.

With the finds of medical instruments there seems to be the implicit idea that items were deposited where they were used, but this may not necessarily be the case.[468] It is important to remember that items may be deposited away from the site where they were used. Why would instruments awaiting repair be left in the hospital and not moved either to a store or to the workshops? It makes more sense for them to have been moved than to be left where they would normally be used. The same is true for items which were broken beyond repair and were to be melted down in order to reuse the metal. In the *valetudinarium* they would be in the way, whereas in a store or near the workshops they would not be accidentally picked up instead of a complete instrument.

For the purposes of comparison with the instruments from Pompeii and Rimini I will examine, in detail, the instruments found at the legionary fortress in Neuss, Germania Inferior and the auxiliary fort at Housesteads on Hadrian's Wall in Britain. According to Baker's table (A4.1) in Appendix Four, eighty-four instruments were found in the legionary fortress at Neuss.[469] Of these, fourteen were found in the *valetudinarium,* an identification which will be examined in more detail below, and, of these fourteen, only four could be said to be unequivocally medical in function, the four scalpels. The remaining instruments are as follows: six spatula-probes, two spoon-probes, and two ear-probes. None of these is exclusively medical in function and it is possible that they were toilet items which belonged to the officers or even to the soldiers, although this latter is less likely. Another scalpel was found in the south section of the camp while a further scalpel and a surgical knife lack provenance. One spatula probe was found in a barrack block, as were two spoon probes, along

[468] Künzl (2005) 59.
[469] Baker (2004) 76-77 & 146-149.

with four other instruments. Interestingly, none of the forceps, olivary end probes or ointment pallets were found in the *valetudinarium*, while six ear probes were found in the *principia* and a spoon scoop was found in the Tribune's house. A number of other instruments were found in other, unidentified, buildings. Thus, we can see that the instruments were by no means confined to one building, but were also found in the barracks and other buildings. The instruments in the barracks were unlikely to be medical instruments because they were not found with any exclusively medical instruments. Therefore, it is more likely that they were every-day toilet items. However, the likelihood that they were medical instruments cannot be completely discounted, it is possible that they were used for medical purposes in the barracks or were stored there, whether their function was medical or otherwise. It is possible that they were the personal property of either one of the soldiers or the doctor. What those instruments which are definitely medical in function do indicate is that medicine was practised in the fort.

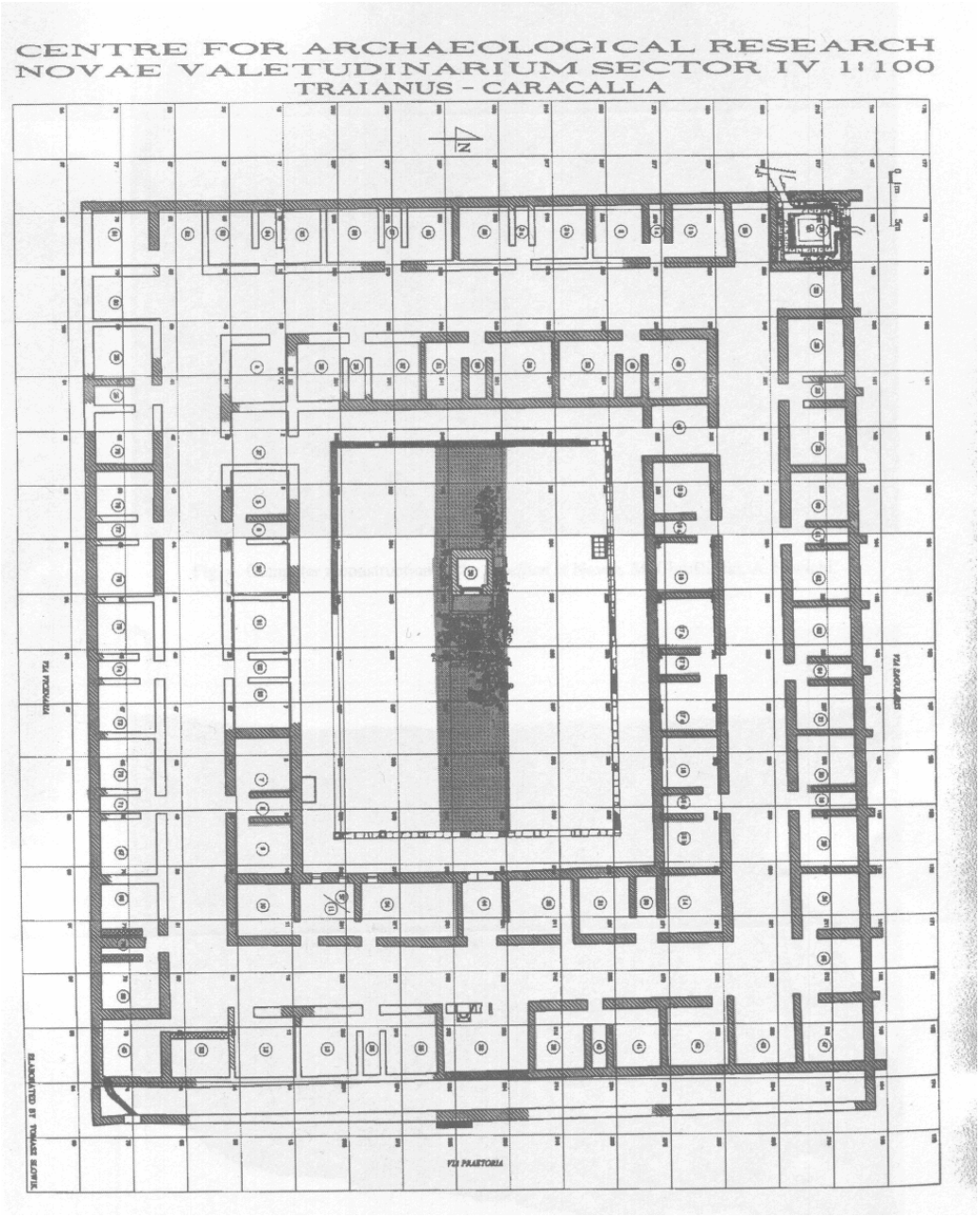
At Housesteads only six instruments were found and, of these, only one was found in the *valetudinarium.*[470] This latter was a spoon-scoop which would have been used to remove ointments or powders from wide-necked jars or bottles. The only exclusively medical instrument found was a sharp hook which was to the south of the fort, not in the *valetudinarium.*[471] This would have been used to hold the edges of a wound apart in order to check that it was clean or to aid the removal of any foreign bodies from the wound, such as shot or an arrow-head. This, along with the inscription of Anicius Ingenuus,[472] proves that medicine was practised on this site. The other instruments were a spoon-probe,

[470] Baker (2004) 186
[471] ibid 186
[472] See p.102.

two ear-probes and an ointment pallet. These latter instruments merely show that the soldiers or doctor at the fort were mixing, and using, ointments which were stored in jars.

More recently the "hospital" at Novae has been excavated.[473] This has produced a large number of small finds, many of which were found in the vestibules between the 'sick rooms' and also in the open rooms at the end of the corridors. Of particular interest is room 48. This is on the inner corner of the corridor and contained many fragments of broken instruments and remains of physician's caskets. Dyczek takes this is as evidence that this was a medical instrument store and uses it to back up his argument that this building was a *valetudinarium.*[474] He also uses it in his argument for rooms 51 and 38, just down the corridor to be operating rooms.[475] This I will address below in relation to the identification of buildings as *valetudinaria.* However, these finds do beg the question of why they were not removed when the army left in the time of Caracalla. The most likely reason is that these items could not be carried with the army and were deemed useless to the local population. It is possible that the army did not have time to clear the entire site before they left.

[473] Baker (2004) 93-94.
[474] Dyczek (1997) 206.
[475] ibid 206.



Ill.3. Plan of the *'valetudinarium'* at Novae. Drawing P. Dyczek, T. Slowik.

So what do these examples tell us about the instruments found in Roman forts as opposed to those found in the domestic setting? There is an important difference between the instruments found at Pompeii and those found in Roman forts and fortresses. The ones in Pompeii were left as a result of the crisis which was unfolding while those left in clusters in Roman forts are unlikely to have been lost but are more likely to have been deliberately left behind. These instruments, some of which will have been finely made and expensive to buy,

could be reworked into new ones in order to save money if they were broken. However, not all of the instruments found at forts and fortresses fall into this category and are more likely to have been abandoned As Bishop and Coulston point out, the idea of 'accidental loss' is one that has been borrowed from the study of coins and widely, and incorrectly, applied to other areas of archaeology.[476] It is far more likely that the military left these instruments on purpose, particularly those left in hoards, probably during retreat from the sites, when they either could not be carried, or in order that they might be retrieved at a later date. They were buried in order to deprive the enemy of the metal, although it is possible that they were buried for ritual reasons but this is unlikely.[477] In the event of the site being reoccupied, the metal could be dug up and re-used.

The types of instrument found in forts appear to be the same as those from Pompeii, Herculaneum and Rimini. When the finds from individual sites are compared to those from the Vesuvian towns there are not nearly as many diagnostic instruments in any one site as there are in the Vesuvian towns. There are a large number of the various types of probe, which is unsurprising as they were most likely used as toilet items and would, therefore, have been fairly common. What is not found in the forts are sets of instruments, such as those found at Rimini[478] or the set of scalpels found near the amphitheatre in Pompeii.[479] Such sets, usually in a wooden case containing a graded set of scalpels and possibly a few probes or other slim instruments, would have been valuable and useful enough to be taken with the army when they moved,

[476] Bishop & Coulston (1993) 34.
[477] Baker (2004) 74.
[478] Jackson (2003) 314-316.
[479] Bliquez (1994) 87-88.

particularly if the march was to be through hostile country. However, when looking at the instruments listed in Baker's appendix there are, though not necessarily from the same forts, the instruments which make up the 'basic kit'. These are; scalpel, hook, forceps, cautery, needle and probes,[480] of which I have extracted the data on scalpels, hooks and forceps and tabulated them by instrument type in Appendix III. So it appears that doctors in the Roman army were definitely equipped to cope with operations ranging from fistulae (long, pipe-like ulcers with narrow orifices) to uvulectomy[481] without recourse to specialised tools.[482]

There are certain types of instrument which one would not expect to find in a fort. There is, surprisingly, one possible embryo hook which was found at Mainz.[483] If it is indeed an embryo hook then it would be evidence for the attached civilian settlement being served by the camp doctor as a way for him to earn a little extra money. However, in the absence of any other evidence this is merely speculation. There are none of the specialised instruments associated with the removal of embedded weapons, such as the Dioclean Spoon but a bivalve dilator was found at the auxiliary fort at Vechten in Germania Inferior[484] which Jackson has suggested is Celsus' 'instrument like a Greek letter'.[485] At Bingen a trepanning saw was found along with other instruments for lifting bone and scalpels, but these were in a grave so cannot necessarily defined as military.[486] So far this is the only example we have of this instrument although the folding handle used for turning the saw have been found in a number of

[480] Jackson (1995) 193.
[481] Removal of the diseased uvula at the back of the mouth.
[482] Jackson (1995) 193.
[483] Baker (2004) 64
[484] ibid 64.
[485] Jackson (1991) 106.
[486] Baker (2004) 64.

places, most recently in Rimini.[487] An example of a dental forceps has been found, at Vindonissa,[488] while, strangely, a cataract needle was found at Carlisle.[489] This latter is rather out of place if it really is a cataract needle, since, as outlined above, good eyesight was a requirement for joining the army and someone with cataracts was unlikely to be allowed to join. If they developed while in service, the soldier would be discharged *causaria misso,* as appears to have happened in the case of Tryphon.[490] It is to be assumed that it would have been used as a cataract needle when treating people from the civilian settlement attached to the fort. Of course, it could also have been used as a needle-cautery and as such would have a place in the kit of an army *medicus* for operating on in-growing hairs or eyelashes or for cauterising small cuts or split lips which had become infected.

It is very difficult to come to any concrete conclusions from the instruments left in Roman forts for the simple reason that very few were left behind in any one fort. What they do tell us is that a number of most likely toilet items were found scattered around the forts, like those at Neuss and Housesteads. From the data in the Appendices in Baker's book we can build up a picture of what operations might have been carried out from the evidence of the instruments themselves. As the 'basic kit' outlined by Jackson[491] is, overall, present in the forts it is reasonable to assume that all of the operations possible with it could have been carried out by the camp doctor. In addition, it seems that at least some doctors were well equipped for formulating medicines with ointment pallets, spatulae and rectangular medical boxes which could have held

[487] Jackson (2003) 317.
[488] Baker (2004) 64.
[489] ibid 64.
[490] Davies (1989) 227.
[491] Jackson (1995) 193.

either the ingredients or pre-formulated medicines.[492] When the variety of other instruments which have been found, such as a bifurcated hook,[493] an oculist's stamp,[494] cupping vessels,[495] a bone lever,[496] a bi-valve speculum,[497] trepanning saws,[498] and female and male catheters,[499] to name a few, are taken into consideration the range of procedures possible becomes much wider, although the examples noted are from graves and as such cannot be exclusively connected to the military. It can be seen that the doctor may not necessarily have treated only the soldiers, but also the people in the attached settlement. This adds an extra dimension to the discussion about the status of doctors in the army. It seems that they may not have worked exclusively for the army, although that would be their main job, but if someone in the nearby settlement needed medical attention the doctor might well have treated them.[500] The female catheter at Bad-Deusch Altenburg could be seen as proof of this but on its own cannot be deemed conclusive.[501] It might have been the case that, on the fringes of the Empire the army doctor was the only available doctor but this is not known for sure. Presumably, the doctor would have his first duty to the soldiers in the base but, when the time allowed, could also treat those from outside the base, thus potentially earning some extra money by charging them for his services. This could make the position of doctor in the army even more appealing to those who considered it. This possible overlap between the army and the civilians is interesting. It would complement the movement of doctors

[492] Baker (2004) 146-186.
[493] e.g. Nijmegen – Baker (2004) 149.
[494] e.g. Nijmegen – Baker (2004) 149.
[495] e.g. Bingen – Baker (2004) 164.
[496] e.g. Bingen - Baker (2004) 165.
[497] e.g. Vechten – Baker (2004) 149.
[498] Bingen – Baker (2004) 165.
[499] Bad-Deutsch Altenburg – Baker (2004) 173.
[500] Baker (2004) 152.
[501] ibid 173.

from civilian life into the army and would be worth studying in greater depth if more evidence for army doctors practicing in the local communities can be found.

Those instruments from Housesteads and Neuss with a purely medical function were not found in only one place but in a number of places within the forts. This implies that medicine might not have been practised in just one place in the forts but wherever it was required, be that the *principia* or the barracks. However, we must bear in mind that these finds are too small for a meaningful spatial analysis and that these instruments may not have been deposited in their place of use. However, the literary sources, historians and archaeologists, on the whole, assume that a hospital was a feature of every fort and fortress.[502] So what does this spread of finds mean? The subject of hospitals in Roman forts needs to be examined in order to see if any further light can be cast on the question of where medicine might have been practised in forts.

It can be seen from the preceding discussion that the instruments from forts raise more questions than they answer. The only firm conclusions possible from the instruments are that medicine was practised in forts, both legionary and auxiliary, and that the range of operations was, in some places at least, large. Everything from an infected split lip to broken bones could be dealt with. The main pattern to emerge is of instruments which have been left behind on purpose by a retreating army. When compared to the instruments from the Vesuvian towns and Rimini the instruments found in forts are similar in style and type with some types which might not be expected to be present being found. Certainly, in the case of the instruments, there is practically no

[502] Hyginus IV.

difference between the army and domestic spheres but whether where they are found can inform us about where medicine was practiced is an area of debate.

Valetudinarium?

The subject of hospitals *(valetudinaria)* in Roman forts has become an area of dispute in recent years.[503] Importantly, it is not disputed that military hospitals existed, since there is epigraphic evidence for them. What is disputed is whether the buildings, which have been accepted as military hospitals, had that function. It has been accepted for the best part of a hundred years that the type of building identified as a military hospital by Koenen in 1904 in the fort of *Novaesium*, in Neuss on the lower Rhine, was a *valetudinarium*.[504] However, it was identified as such on the strength of a number of instruments found there, which could have had a medical or toilet function, and because it fitted Koenen's idea of what a hospital should be like with rooms off side corridors to minimise the transmission of infection.[505] This latter is anachronistic as the ancient idea of the spread of infection was not the modern concept which only came about following the work of Pasteur, Koch and others between 1860 and 1900 in microbiology, proving that micro-organisms cause illness and leading to anti-sepsis and asepsis in hospitals.[506] Ancient ideas of disease and infection were based on 'bad air', hence Vitruvius' strictures on where to place a city.[507] As noted above, the instruments found in the "hospital" at *Novaesium* were not the only ones to be found in the fort. In total, fourteen instruments have provenance in the "hospital", but a further sixty-seven possible medical instruments were found in the fort. These were scattered with some being found

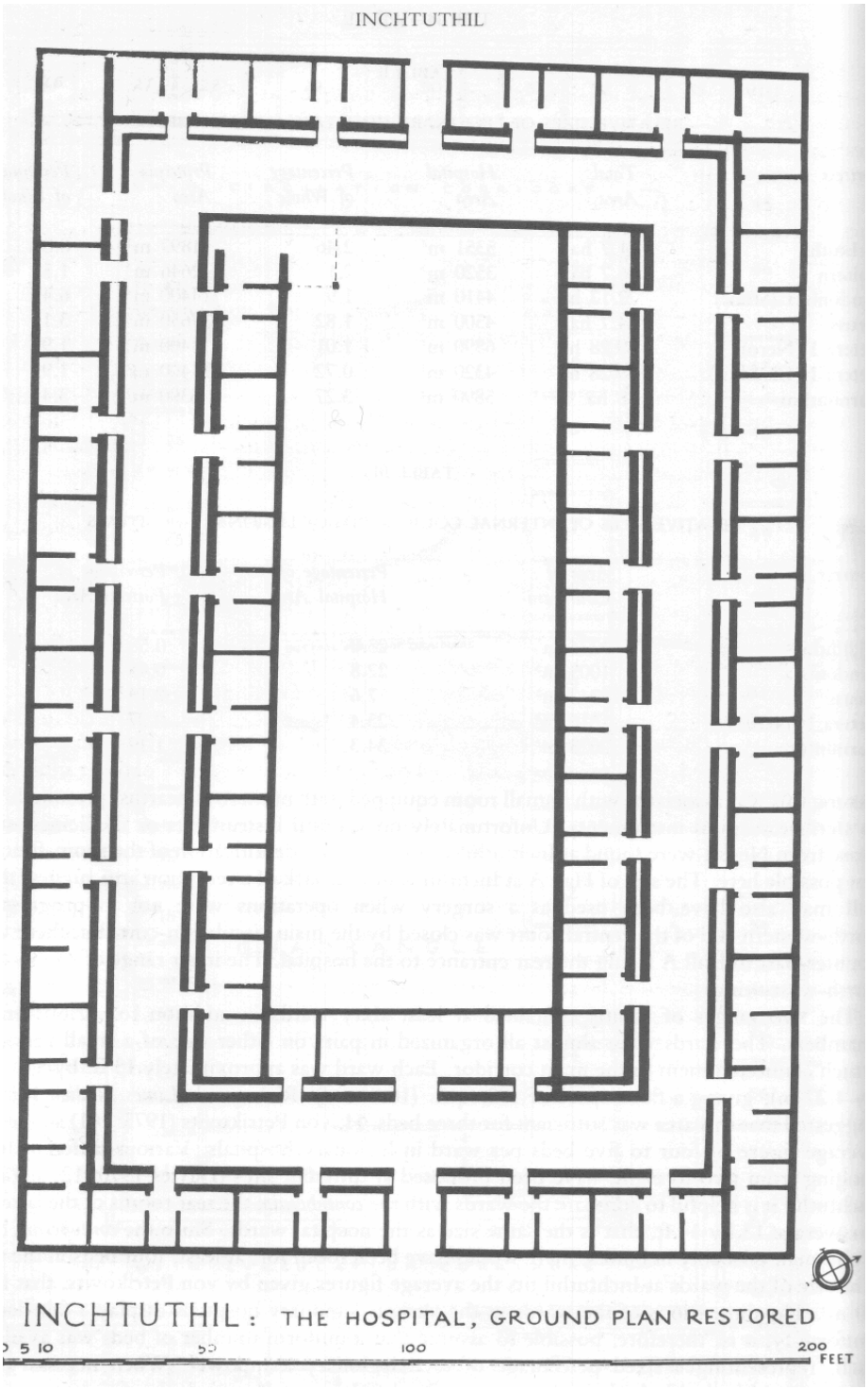
[503] See Baker (2004) and Künzl (2005) for the main arguments.
[504] Baker (2004) 83.
[505] ibid 83.
[506] Walton et al (1986) 594-595.
[507] Vitruvius I 4.1, see above p.13.

in barracks, some in the baths and even one in the Tribune's house. There were some groups of instruments, apart from those in the hospital, elsewhere in the base. While none was as big as that in the "hospital" no suggestion has been made that medicine may have been practised in these other locations.

As Baker points out, this does appear to be rather flimsy evidence on which to base an identification.[508] Yet, the idea that this type of building was a hospital has taken root to the point where it is accepted as fact and defended by a number of eminent scholars, including Ernst Künzl[509], whose arguments I address below. This is an example of how the modern preconceptions of what the ground-plan of a hospital should be like have influenced the identification of this type of ground-plan in Roman forts as hospitals.[510] The 'hospital' at Inchtuthil is one of many which has been identified on the strength of the ground plan and no further argument for why this building should be identified as such are put forward.[511] The probability that not every site had a *valetudinarium* and that the sick or wounded soldiers were treated in their own tents is borne out by the story of Publius Sextius Baculus who was a chief centurion of Caesar's legion. Despite having been ill and not eating for five days, so we are told, he was worried about the safety of the rest of the garrison who had been left in the base and walked out of his tent. On seeing the enemy close by seized weapons from the nearest man and stood guard at the gate, gaining time for the rest of the garrison to gather their courage and man the fortifications. It is noticable that Baculus was not in the *valetudinarium* but rather in his tent despite the fact that he was ill and had not eaten for five days.

[508] Baker (2002) 83.
[509] Künzl (2005).
[510] See Ill.4.
[511] Pitts & St Joseph (1985) 91.

Was this because there was no *valetudinarium?* That seems the most likely reason.



Ill.4. Reconstructed plan of the *'valetudinarium'* at Inchtuthil

Two small, but significant, pieces of evidence which should certainly not be ignored in this debate about hospitals in Roman forts are Vindolanda Tablets 154 and 155. Both are from the same period of the fort's occupation, between AD92 and AD97. No. 154 is a report on where the men of the First Cohort of Tungrians are posted along with a tally of the number of sick at Vindolanda. No. 155 is a general military report of how many men were working and where they were working in the workshops. The relevance here is two-fold. Firstly, when the number of men at work is compared to the number of men from the First Cohort of Tungrians mentioned in No. 154 it can be seen that there must have been at least part of another unit at Vindolanda.[512] Secondly, it mentions a hospital and, although the context is unknown, it has been suggested that it lists the number of men working in the hospital. As a result of this, we can say for certain that there was a hospital in Vindolanda at this period, but just because this is true in some cases does not mean that there was a hospital in every fort.

Künzl, in his 2005 paper, addresses the arguments that the identification of specific buildings as hospitals in Roman forts is incorrect.[513] He states that the military hospitals have a characteristic ground-plan which distinguishes them from the private doctors' practices, which can only be identified by the instruments found in them since they have no similarity in ground-plan.[514] This immediately begs the question of whether those houses where instruments were found in Pompeii were the houses of doctors at all? The answer, as we have seen above, is possibly yes, but only for those where diagnostic medical

[512] Bowman & Thomas (1994) 90-100.
[513] Künzl (2005) 55-63.
[514] ibid 55.

instruments were found. If you argue that medicine was practised wherever instruments were found then those found under the remains of a person next to the amphitheatre in Pompeii[515] must, by that line of reasoning, have been used right there. This is plainly ridiculous since the obvious reason for their being there is that they were being removed from Pompeii when the volcano erupted, though whether as plunder or by the person who owned them we cannot know.

In particular, Künzl uses the example of *Novae* to back up his arguments regarding this identification. He does not argue for operating rooms as Dyczek does[516] but instead says that there was none.[517] He points to the *sacellum* in the courtyard of the building as conclusive proof, when examined alongside that of the instruments, that this was a hospital.[518] The shrine appears to have been to Asclepius and Hygeia but there are also inscriptions to 'Iovi Optimo Maximo et Iunoni Reginae et Minervae', a separate one just to 'Iuno Regina' and the last one to Sabazios.[519] Sabazios was a Phrygian god who became incorporated into the Roman pantheon. However, we do not know much about him. The people setting up the inscriptions range from legionary legates to a doctor, Aelius Macedos, and, taken with the dedications of the inscriptions this would certainly point to the practice of healing nearby, perhaps even within that same building. However, an examination of the finds confuses the matter. Dyczek notes that in nearly every vestibule and many of the sick rooms there were amphorae for olive oil. This is in the context of a discussion on the supply of the Roman army so he is not making a specific argument for it being a hospital but what

[515] Bliquez (1994) 87-88.
[516] Dyczek (1997) 206.
[517] Künzl (2005) 59.
[518] Künzl (2005) 61.
[519] Dyczek (1997) 203.

were these olive oil amphorae doing in hospital rooms? It is just about understandable that they might be in the vestibules but in the actual rooms seems to be an excess of olive oil in relation to the patient(s). It is far more likely, in the light of this evidence and that of the other finds from the building, that this was a store and that the "Koenen's threes" arrangement of the rooms were for each century to have a separate store-room, as opposed to a separate sick-room,[520] with an area for those items which were smaller, or in constant use, such as glass jars and mortars, to be stored on wooden shelving such as that discussed by Press.[521] The pieces of armour present[522] could well be the result of it being stored in these rooms when it was not needed. The room of medical instruments fits into this as it appears that they were broken and it is likely that they were being stored prior to being recast or mended. The open rooms at the ends of the corridors containing lamps and tableware in large quantities[523] were most likely for the use of all, hence the open design.

This then begs the question of why there was a shrine in the courtyard of a store? The placing of the shrine may well be merely incidental as it would be a quiet place where those who wished to pray to the gods could come. However, the significance of the shrine being to Asclepius and Hygeia should not be overlooked. It is possible that part of the building, perhaps a room, was used for the treatment of the sick and wounded, but that they were then sent back to their barracks to recover and did not stay in the building as in-patients in the way that the construction of the building as a *valetudinarium* would suggest. This would explain the room which Dyczek thought was used for the making up

[520] Davies (1989) 223.
[521] Press (1994) 93.
[522] Dyczek (1994) 89 & (2002) 687.
[523] Dyczek (2002) 686.

of medicines from which a marble grinder and a number of small bowls are all that have been excavated.[524] Why treat the sick and wounded in a store? The obvious reason is that all the materials which you might need for the treating of the sick and wounded would be close by. The ground-plans of those buildings identified as military hospitals vary considerably, there appears to be no completely standard plan. However, it is easy to project modern army values onto the Roman army and the standardisation of buildings is a case in point. Both Polybius[525] and Hyginus[526] describe the layout of Roman camps but their plans, while similar in many respects, are also very different.[527] This is what we see with the design of those buildings identified as hospitals. In particular when it comes to the identification of specific rooms as operating theatres there is a great danger that modern values are being projected onto the ancient world. While there can be no doubt that battles took place and soldiers were wounded, most of these battles would have taken place several days march from the nearest camp. Therefore, the doctors would have had to take what they could carry in the way of medicines and bandages with them and the idea that there needed to be an operating theatre in the hospital in the fort seems almost ridiculous. If the severely wounded were several days' march away then they would never make it back to the camp to be operated on. What procedures could be carried out would be done on the battlefield, if at all.[528] This would render an operating room in the hospital pointless. It is true that the soldiers may well have been injured or even wounded while training but the chances of this happening are lower and it is to be questioned as to whether there was a

[524] Dyczek (1994) 91-92.
[525] Polybius VI 27-32.
[526] Hyginus *Liber de munitionibus castrorum.*
[527] Davies (1983) 27ff.
[528] Nutton (2004) 179.

designated operating room in hospitals in Roman forts. As Baker points out, the perception that a special room is needed to carry out surgery is a modern one connected to modern medicine and there is no mention of a separate operating room in the literature.[529] Perhaps the room at Neuss, identified as such because of the two hearths, was instead a kitchen. It was originally suggested that these hearths were for the sterilisation of instruments, an argument which has been accepted almost without question.[530] However, it is a flawed argument. There is no evidence that the Romans knew about the spread of disease through unsterilised instruments and, therefore, would not have thought of heating their instruments in order to clean them. At most they would probably have washed the blood off them. The only instrument which was routinely heated was the cautery which, by its very nature, was heated in order to be used. The rooms which were identified at Novae as having possibly been operating rooms were identified on the strength of the walls having white plaster with white paint, the other rooms had white and rose plaster which was painted purple,[531] it had windows facing onto the courtyard, it was near the room where the broken instruments were found and it is similar to those found at Novaesium and Vetera.[532] It is a modern preconception that operating theatres be white and it is questionable whether this was a consideration when choosing a room in which to carry out surgery.

In addition, it is highly likely that the provision of medical facilities was up to the individual commanders and that some may well have chosen not to have a separate building as a *valetudinarium.* As we shall see below, these

[529] Baker (2002) 72.
[530] See Jackson (1988) 135 for an example of this argument being accepted without question.
[531] Dyczek (1997) 200.
[532] ibid 202.

could just as easily have been stores.[533] It is important to keep in mind that, as noted above, these buildings are not the only places where instruments were found in Roman forts.

Hyginus Gromaticus, sometimes referred to as Pseudo Hyginus, wrote a theoretical surveying manual, *Liber de munitionibus castrorum* , most likely in the reign of Trajan, which covered every kind of military unit the student of surveying might possibly encounter, including camels.[534] In it he lays out where the hospital should be placed:

> Quotiens autem quinque vel sex legiones acceptae fuerint, bi(n)ae cohortes primae lateribus praetorii tendere debebunt, duae in preatentura, super quibus valetudinaria, deinde vexillarii ve(l) cohors secunda; et si res exiget, cohors peditata quingenaria loco vexillariorum solet superponi, et, si strictior fuerit pedatura, cohors legionaria dari debet, sed numero suo, ut CXX pedes valetudinarium et reliqua, quae supra tendent, accipiant, hoc est veterinarium et fabrica, quae ideo longius posita est, ut valetudinarium quietum esse convalescentibus posset.[535]

The hospital, it seems, was ideally to be placed back from the road behind the barracks of some of the soldiers but at a good distance from them in order to ensure the quiet which was required for the hospital and the patients to be treated there. In addition, while the animal hospital *(veterinarium)* was to be close, the workshops *(fabricae)* were to be placed further away, presumably because of the noise which would have come from them. It makes sense for the *veterinarium* to be next to the hospital as the skills required for the treatment of horses and the treatment of people were not that different and the resources used by each could be shared. Of course, this is only an ideal, not a proscription for every Roman marching camp and the evidence of the archaeology points to this – no two excavated forts are the same.[536] Taking this evidence into account it is possible that not every fort had a designated hospital. Perhaps a few rooms in

[533] See p.125ff.
[534] Johnson (1983) 27.
[535] Hyginus IV.
[536] Goldsworthy (1996) 112.

the administrative building served as a treatment centre, or doctor's office, and the soldiers who were sick or wounded were sent back to their barracks to recover.

However, in the case of the identification of these buildings as *valetudinaria*, the instruments are the only secure piece of evidence that they might have had some connection to the practice of medicine in the fort, tenuous though it is. Künzl himself says that the identification of the function of a room from the instruments found in it should only be done with the utmost caution and attention to all the other analogous finds.[537] This means that the initial identification of the building at Neuss, which was based on the instruments found there and the ground-plan which matched what Koenen thought a hospital ground-plan should be like, is further weakened.

Baker points out that this style of building, with rooms off side corridors, could easily have been a store.[538] The remains of plants with medical application were also found in the "hospital" at Neuss and this could be seen as supporting the hypothesis that it was a hospital.[539] However, it also supports the idea that the building was a store and that these plants were merely stored, rather than used, there. This also ties in with the evidence of amphorae of olive oil in the vestibules and rooms, pieces of armour and the rooms containing lamps and tableware, as mentioned earlier.[540] Johnson contributes to the debate that some of these buildings may have been stores. She points out that there are two types of building which have been identified as hospitals. One was the courtyard-type with two ranges of 'wards' around a courtyard, as at Neuss and

[537] Künzl (2005) 59.
[538] Baker (2002) 74.
[539] Salazar (2000) 236.
[540] Dyczek (1994) 89-93 & (2002) 697.

Inchtuthil, and the other is a much smaller corridor type with a central corridor with rooms on either side, such as that at Fendoch.[541] Johnson notes that there were two corridor-type buildings found at Corbridge. One was in the auxiliary fort and the other was at the military depot at Beaufort Red House. The one at the depot was immediately beside a fenced enclosure containing pits with evidence of the intense burning associated with metal-working. This building has therefore been identified as a *fabrica.*[542] However, the corridor-type building identified in the fort as a hospital is of a similar design and yielded an interesting and significant find. Under one of the rooms a small iron-bound chest was found containing scrap metal, nails,[543] spear heads,[544] mason's tools, carpenter's tools,[545] iron armour plate *(lorica segmenta),*[546] a bronze scabbard and fastenings,[547] writing tablets,[548] a wooden mug,[549] and glass gaming counters.[550] This does not tally with the idea that the building was the hospital and Bishop and Dore, in the report of the site, come to the conclusion that, with its close proximity to the granaries, it was most likely a store.[551] Davies suggests that the hoard was buried to develop iron rust and verdigris which were used for the drying and cleansing of wounds.[552] However, this does not explain why the items which were not made of iron, copper or bronze were included, or, indeed, why they would be buried instead of just being left open to the elements. If burying them to develop rust for medical purposes why bury them

[541] Johnson (1983) 162.
[542] Johnson(1983) 164.
[543] Allason-Jones & Bishop (1989) 61-69.
[544] ibid 9-22.
[545] ibid 53-60.
[546] ibid 23-52.
[547] ibid 75-76.
[548] ibid 83-85.
[549] ibid 83, 86.
[550] ibid 82.
[551] Bishop & Dore (1989) 128.
[552] Davies (1989) 219-220.

in a room where the ground would probably be dryer than outside, making the formation of verdigris a longer process, and where the necessity for digging the hoard up would render the room useless when it was being excavated? Bishop and Coulston a few years later, when looking at this hoard in the context of metal items being deliberately left behind, come to the further conclusion that this was a scrap metal hoard as many of the spear-heads, while in perfect condition had broken shafts and were, therefore, useless. It appears that the Corbridge Hoard had been packed for transport and left behind at the last minute,[553] buried under the floor of the store from which it was to be removed. Johnson further develops the argument for these buildings being stores with a comparison of the ground-plans to those of the civilian granaries and store-buildings *(horrea)* in the port of Ostia, near Rome, as shown on the Marble Plan of Rome. They are remarkably similar and, while it cannot be said for certain that these types of building were all stores, it can certainly be maintained that a significant number of them may well have been.[554]

In relation to the first phase of the "hospital" at Wallsend Hodgson admits that while the later phases of the building have been identified as a hospital this does not mean that the earliest building, Wallsend XXI, had the same function. It could easily have been a workshop, though not one used for metalworking as the burning which is associated with that particular activity is not present, a store, or even accommodation.[555] The later phases of the "hospital" at Wallsend were stone built but the latrine in room 2 was earlier than

[553] Bishop & Coulston (1993) 35.
[554] Johnson (1983) 164.
[555] Hodgson (2003) 126.

the walls of the "hospital".[556] Hodgson admits that there is no real evidence for this building to be identified as a hospital but puts forward the arguments that, firstly, the existence of *valetudinaria* in auxiliary forts is proved by the Vindolanda tablets, although he acknowledges that this does not mean that every fort had one. Secondly, he points out that these buildings do not contain the facilities which could be expected if they were for officials based in the fort and that,

> Rather than forming a residential unit for an individual household in this way rooms of a similar nature occur all around the courtyard as spaces entered and used separately.[557]

This does not preclude it from being for permanent staff of the fort or its being used as offices. A quick glance at a map of Pompeii shows that a number of houses had individual rooms off courtyards.[558] Thirdly, he states that the provision of a communal latrine implies a communal function for the building. Yet an examination of houses in Pompeii does not bring to light en-suite latrines. In fact it seems that it was common for latrines in Pompeii to be either in or next to the kitchen.[559] Therefore, this argument appears to fail. In addition, the latrine was built before the hospital (see above). Finally, he cites the single medical instrument, acknowledging that it is not conclusive, and the large number of lamps as evidence that the building had a function other than simply residential. It is entirely possible that the lamps are there simply because these were offices where work was done late enough to require lamps, and the days are short in winter on Hadrian's Wall. As we can see, once again, the identification of a specific building as a hospital is not necessarily based on the most conclusive of evidence.

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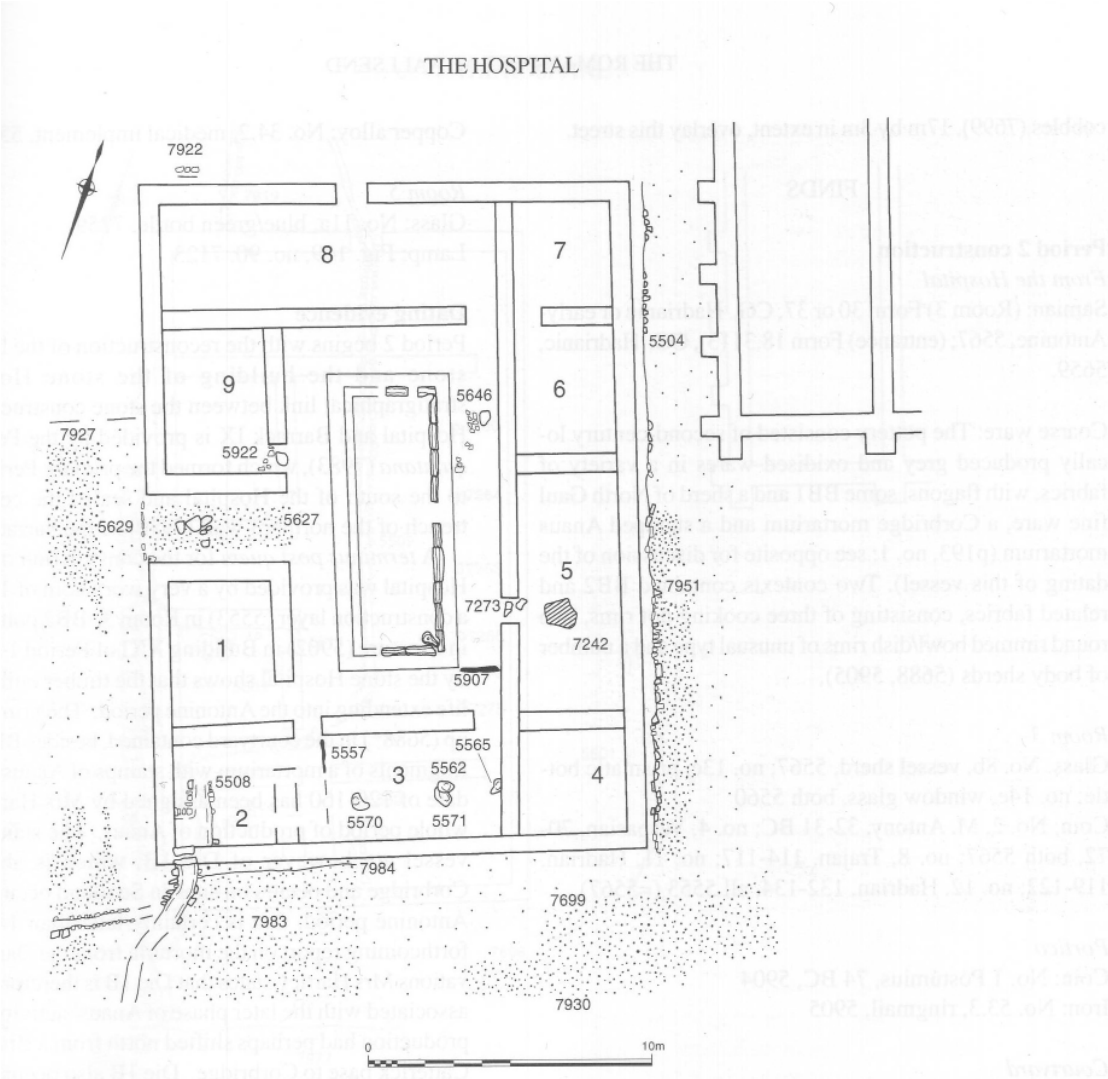
[556] Hodgson (2003129.
[557] Hodgson (2003)140.
[558] e.g. VII iv 62 & VII ii 16.
[559] Allison (2005) 99-100 & 103.



Ill.5. A simplified plan of the Phase 2 *'valetudinarium'* at Wallsend.

The argument in favour of these buildings being stores is not only applicable to these smaller auxiliary "hospitals" but also works for the larger and more distinct type of ground-plan. As mentioned above, the find of medicinal plant remains at Neuss suggests that it was either a hospital or a store. Davies suggests that the ground plan of the larger *valetudinaria* developed from the layout of the tents which initially comprised the *valetudinaria* before a permanent camp was built. These were, he states, grouped in a hollow rectangle behind a pavilion or marquee and were related to an external, but adjacent

latrine pit.[560] This argument seems to be based on pure conjecture with no evidence to support it. Nutton states that the wooden hospital building at Haltern, on the banks of the Lippe in Germany, resembles a group of tents in wooden form.[561] Interestingly, Baker does not mention this at all in her, albeit brief, discussion of the same building,[562] yet it is referenced by Salazar who takes it a step further by stating that the plan, 'obviously derives from a collection of tents, *tentoria*, so one might deduce from this that there were special "hospital" tents for the sick and wounded.'[563] While tents would have been used in the forts before they were made permanent and it is possible that there were specific hospital tents, the layout of which may have been similar to the layout of some permanent hospital buildings, there is no evidence that this was so. It is possible that the hospital, if there was one, consisted of just one tent in the marching camp described by Hyginus since, as Goldsworthy highlights, the logistics of moving the Roman army were incredibly complicated and the likelihood of them carrying extra tents when they might not be needed, if, for example, the sick and injured could be treated in their own tents, is small.[564]

Furthermore, there is a lack of consistency in the location and design of these buildings.[565] This could be said to be due to the different sizes and types of legion, but the very variety in position and type calls into question the validity of the identification of the function of these structures. Hyginus placed the hospital in a quiet part of the fort, behind the *Praetorium,* or commanding

[560] Davies (1989) 220-221.
[561] Nutton (1969) 262.
[562] Baker (2004) 90.
[563] Salazar (2000) 78.
[564] Goldsworthy (1996) 289-290.
[565] Baker (2004) 71.

officer's private quarters, and dictated that the *fabrica* (workshops) be placed at least seventy Roman feet away to keep the noise out of the hospital.[566] While this is an ideal and is unlikely to have been followed in every case it seems strange that many of the "hospitals" identified in Roman forts are next to the granaries, not the most peaceful of places to have a hospital with the daily distribution of rations and coming and going of carts bringing new supplies. This proximity to the granaries does suggest that they could have been stores but that is, for the time being, an argument from silence, as is that for them being hospitals. This means that it cannot be proved either way, but that is no reason for the argument which has been accepted for the last hundred years to continue to be accepted. While it is possible that some of these buildings were used as hospitals, it is equally possible that some of them were used as stores. Therefore, each one should be examined on its own merits and not just immediately pigeon-holed because it fits an identification which is shaky at best.

This becomes more significant when compared with the domestic sphere. As noted in Chapter 2, there appear to have been no designated places for the practice of medicine in the domestic sphere, although the *Domus* 'del chirurgo' could be seen as one such place, and we can only make educated guesses as to the system involved in going to the doctor in the ancient Roman world. Vegetius tells us that,

> In order that soldiers who by chance are sick might be refreshed with proper food and cared for by the skill of the medics, perpetual diligence is required of the officers and of the tribunes and of the official himself who holds the major responsibility.[567]

[566] Johnson (1983) 159.
[567] Vegetius III ii.

This could be read as the medics providing all of the care for the patient but that is unlikely. I read this as meaning that the medics would drop by at regular intervals to check on the patient and administer medication but that the main care for the patient would have been within the barracks and shouldered by his fellow soldiers who were supervised in this by their commanding officer. Even if there was a designated *valetudinarium* this text points to the patient's fellow soldiers looking after his day-to-day needs while the medical staff dealt solely with the his medical needs.

Thus, we can see that there is a problem with the identification of a specific building ground-plan or type as being exclusively that of a *valetudinarium.* This is not helped by the lack of knowledge about the mechanism for going to the doctor in either the urban domestic or the military setting. The finds of instruments in these buildings cannot be treated as conclusive evidence for their having been hospitals since these could have been left there for a number of reasons: storage, loss or deliberate deposition are the most likely reasons and, since they may not have been stored, lost or deposited where they were used, they can only be indicators of medical activity within the fort in general and not specifically within the building. By this definition, the "hospital" at Inchtuthil cannot be identified as such. Even the presence of the large, stone-lined drain which led from the building out under the ramparts is not conclusive.[568] If it was a store where dry goods were kept then it was important that the water from the roof be drained away properly and not given a chance to accumulate and possibly damage the items which were being stored in the building. From the archaeological point of view it is almost as hard to

[568] Pitts & St Joseph (1985) 100.

identify specific buildings in which medicine was practised in the army as it is to do so in the domestic sphere.

The literary evidence certainly points to the possibility of hospitals in Roman forts, but that they are mentioned by Hyginus Gromaticus in his description of the plan of a fort does not mean that they were to be found in every fort. He places the hospital in the front section of the camp along with the *veterinarium* for sick horses, the workshop and the quarters of the various companies of marines, pioneers and scouts.[569] Interestingly, Vegetius writing in the late fourth or early fifth century AD, does not make any mention of a *valetudinarium* in his work *Epitoma Rei Militaris* merely commenting that the officers and medics must take care of those who are sick.[570] With the difference in time between these two writers it is possible that this could indicate a change over time in the provision of medical care in the Roman Army. It is possible that the provision of a hospital depended very much on the commanding officer and how much money he was prepared to invest in treating his men. This provision of a designated space for the practice of medicine is in marked contrast to the domestic sphere where there was no designated public space for the practice of medicine and it is still mostly unclear where medicine was usually practised.

Conclusions

As has been demonstrated, the evidence for medicine in the Roman army is patchy and inconclusive. We have evidence for doctors, both literary and epigraphical, and there is literary evidence for hospitals but the modern designation of a specific design of building as a hospital is cannot be applied

[569] Johnson (1983) 30.
[570] Vegetius III ii.

without careful examination of each case on its own merits since it could be argued that some buildings identified as *valetudinaria* might have been stores. Medicine, and in particular, doctors in the army appear, from the evidence we have, to have been more structured than in the domestic sphere, which is most likely a result of the inherent organisation of the army as a whole. Since the rest of the men are assigned ranks it makes sense for the doctors also to have had ranks. The day to day work of a doctor, as we have seen, was most likely the treatment of the sick, as opposed to the wounded, and it appears that eye diseases were enough of a problem that they merited special mention in the list of a legion's strength. Due to the variety of their diet and the ability of the army to commandeer food from the surrounding countryside, it is unlikely that the deficiency diseases, which could be expected in a cross section of the population from an ancient town, would be seen here and it is to be expected that the general level of health might have been reasonably high with the regular training of the men contributing to keeping them fit and well. The material evidence for the practice of medicine in the Roman army is far scarcer than from the domestic context and this very scarcity makes it far harder to draw conclusions about the organisation of medicine in the Roman army. Whether there was a certain level of competence which had to be attained by the *capsarii*, what the various titles found on gravestones actually meant and whether having a hospital was a standard feature of a fort or fortress or at the discretion of the commanding officer are, as yet, unknown. What can be said is that there seems to be more of tendency, in the literary sources at least, towards a designated space for the practice of medicine as opposed to the domestic sphere where there is no evidence for designated medical spaces and that these

designated medical spaces did not occur as often as has usually been thought. It is important to reassess this area in the light of new evidence and to examine each site on its own merits. This is a complex area of study and contains some areas which are hotly disputed, mainly because of the lack of concrete evidence. However, as we have seen, it is possible to draw a number of conclusions and comparison with the domestic sphere and these, as we shall see, shed yet more light on it.

4. Conclusions

Medicine in the Roman world appears, at a glance, to be fairly uniform. However, as I have demonstrated above, this is not the case. Differences and similarities can easily be found between medicine in the East and West of the Roman Empire.[571] I have chosen to look instead at the differences and similarities between medicine in the domestic sphere and medicine in the army context. This has produced some interesting results. In some respects they are not as different as might be expected, and there have been some surprising finds of instruments, for example the embryo hook in the fort at Mainz.[572] Yet, these areas are, in other respects, quite substantially different.

The first and most obvious difference is that the basic level of health in the army was more likely to be constant than among the general populace due to the more constant nutrition. However, when looking at this particular aspect the sources for this information have been very different. In the case of the army most of the information has come from literary sources, not the skeletal evidence which we are lucky to have from Herculaneum and Pompeii. The latter has been used, along with literary evidence, to provide an indication of what the health of the general populace might have been. What we have for the army is, therefore, more likely to be an ideal than the reality, while the picture of the health of ordinary people is more likely to be accurate, if restricted to those who did not manage, or choose, to leave the Vesuvian towns before the eruption. This difference in evidence does weaken the conclusions drawn from it. If Vegetius is to be believed, there were height restrictions for getting into

[571] e.g. Nutton (2004) 257-258.
[572] Baker (2004) 64.

the army along with some kind of a medical to ensure that recruits were fit and healthy, in particular, the eyes were important.[573] This would hopefully ensure that the army did not have recruits who were unfit for service. As a result, those in the army ideally would have been the younger, fitter and healthier members of the male population, though whether this was the reality is open to debate. If their fitness was maintained with regular exercise and good diet, which, while the latter was certainly possible in Italy, would have been more difficult on the fringes of the empire where supplies could have been more difficult to get, the risk of disease would have been lower since people who are fit, healthy and have a good diet are less susceptible to disease. However, the army was not completely free of disease, as we can see from Vindolanda tablet 154.[574] This shows that the belief that the main job of the doctor in the army was the treatment of wounds is incorrect.[575] 80% of those unfit for duty were either sick or had eye problems, thus, it can be said that around 80% of a camp doctor's work on a day-to-day basis would have been the treatment of the sick and not the treatment of wounds. It also seems that the good diet could not prevent the decay of teeth in at least one soldier, Erc26.[576]

It is probable that the distribution of work that a civilian doctor would find himself doing would have been similar with the sick far outnumbering the wounded or injured. Unfortunately, we have no equivalent record for the workload of a doctor in an urban context but it seems that illness might be more common than broken bones and other injuries. The teeth of the people from both Herculaneum and Pompeii show that there were high levels of disease

[573] Vegetius I iv.
[574] Bowman & Thomas (1994) 90-98.
[575] Webster (1969) 252-254.
[576] See p.86.

lasting more than two weeks in children, causing enamel hypoplasia.[577] This evidence of frequent childhood illness lasting two weeks or longer might indicate the presence of endemic malaria in Pompeii and Herculaneum but this is not definite. Also, an army doctor is unlikely to have had to treat nearly as many children as a doctor in an urban domestic setting, although this cannot be ruled out completely as it appears that at least some military doctors may have treated the people in the *vicus* next to established forts and fortresses. In addition there is evidence for tuberculosis and even possibly syphilis. but more research does need to be done into the exact nature of the diseases prevalent in Pompeii and Herculaneum. To this end Henneberg and Henneberg are working on the skeletons from Pompeii in an attempt to find out exactly which diseases were present among the ancient population.[578] These long periods of disease will have had an impact on the height achieved by these children.

The question of whether these diseases would also have affected the army is a broad one. It would depend on where they were, what the local diseases were and whether anyone had brought a disease with them from their home town. In fact the army, in addition to being a means by which religion was spread throughout the empire, was probably also the means by which diseases spread to new areas with the men carrying illnesses, to which they had immunity, with them. However, this will not have been one-way traffic. The army will have been vulnerable when they arrived in a new area to the local diseases to which they had no immunity. In this way we can see that, although I have treated army and domestic medicine as separate entities, there was in fact interaction between the two. This is further underlined by the fact that a veteran

[577] Roberts & Manchester (2005) 75-77, see above p.12ff.
[578] Henneberg & Henneberg (2002) 187

colony, the *Colonia Cornelia Venerea Pompeianorum,* was imposed on Pompeii by Sulla in 80BC as punishment for the town's resistance against him in the Social War.[579] While this will not have been the same as having a fort outside the town the impact may well have been similar with the veterans bringing with them the diseases which they had picked up elsewhere. It has also been shown that this overlap between the army and the civilians might well have been present in the case of the doctors who worked in the army.

Diet has already been mentioned but it is significant enough to merit a concluding paragraph of its own. At a very basic level the diet of the people and the army were the same, the basis was grain which was either made into bread or a kind of porridge but there the similarity stops. Those with money would have been able to afford a wide range of foodstuffs which soldiers might not have had, since they would have had to pay extra for them, while theose who had very little moneysometimes might not have been able to afford even the most basic items. Certainly fresh fruit and vegetables were unlikely to make even infrequent appearances on their menu and meat would have been out of the question. Thus, the poor would have suffered from malnutrition and deficiency diseases[580] while there is only one recorded case of scurvy in the army.[581] As has been discussed above, while those with money had access to a wider range of foodstuffs, this does not mean that they would have had a balanced diet, it is likely that, like Trimalchio in Petronius' *Satyricon,* they may have eaten too much of what was bad for them.[582]

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[579] Cooley (2003)18.
[580] Garnsey (1999) 45-51.
[581] Davies (1989) 203.
[582] Petronius XV 26-78, see above p.12-13.

Overall the majority of the population are unlikely to have eaten as well as the army and, therefore, would have been at far greater risk of disease because their immune systems would have been suppressed due to malnutrition. Perhaps one of the most startling facts is the sheer quantity of food which the army required each day. This was supplied by a combination of a massive official supply system and small scale civilian trade. The supply of food was the responsibility of the *praefectus castrorum* while the *frumentarii* were troops whose role was the procuring of food.[583] It is possible that the arrival of the army into a new area may have had a major impact on the local populace and might have left the local people short of food while the army ate well.[584] This is just speculation but, with the quantities discussed in Chapter 3, it would be surprising if the arrival of the army in an area did not have a negative impact on the food supply and, as a result, on the health of the local population. Certainly the arrival of the Roman army into Britain changed the economy from subsistence farming to agriculture which produced huge surplus[585] while the Vindolanda Tablets attest to the wide variety of foodstuffs which were being brought in for the army or individuals within it.[586]

The lifestyle of a person has a major impact on their health and someone who is fit, active and well fed, is less vulnerable to disease. The lack of evidence for overwork among those who could afford to have others do the work, although some appear to have taken part in athletics,[587] is in marked contrast to the less well off members of society and slaves who worked hard

[583] Alcock (2001) 149.
[584] See p.78.
[585] Alcock (2001) 149.
[586] Bowman & Thomas (1994) & (2003).
[587] e.g. Erc86 as discussed on p.22.

enough to pull the muscle connections to the bone so that it shows on their skeletons.[588] In contrast to this wide variety in the populace there are the fit, well-fed soldiers who were likely to be exposed, not only to the dangers of battle, but also to the dangers of an unfamiliar country with new diseases to which they had no immunity and would, therefore, be more susceptible to catching, as we have seen in Chapter 3. In addition they will have been at risk of injuries when carrying out building work, whether it be while building an aqueduct, digging ditches for a fort or mining.[589] However, these are not hard and fast categories. There will have been variations within each one which cannot be addressed in the space here. Importantly, we must remember that among both civilians and the army there will have been variations, to a greater or lesser degree, in what people ate and how much of it they ate.

In each of these groups disease was not the only hazard, although it was probably the most common. There was also the risk of injury. For the army this could be in battle, training, or even when just digging a ditch.[590] For slaves and the poor they were likely to injure themselves at work, such as the injuries sustained by Erc27, while the very rich were less likely to injure themselves in these ways. With a broken bone, if a person could afford the attention of a doctor one would be called to set the fracture, but not everyone was so fortunate. We have seen above what a difference the proper setting of a fracture could make to the future use of the limb in question. Those who could not afford the attention of a doctor would have had to make do as best they could with reduced mobility and a shortened limb.

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[588] e.g. Erc28 as discussed on p.23.
[589] Davies (1989) 63-65.
[590] Erc26 shows evidence of injury which is discussed on p.86.

This brings us to the question of doctors and how, and why, they differed in the army from the domestic context. It seems that a doctor could work in the army for a period of time and then go back to his civilian 'practice', as we would term it today. It appears that the incentives to do this were principally a guaranteed income, not having to pay for drugs and the other items needed for the treatment of patients, and the opportunity to study internal anatomy when tending the wounded or examining the dead on a battlefield. Once again we are seeing an overlap between civilian and army medicine, this time in the form of the doctors themselves. It seems that a doctor who was working in the army was exempt from all civic duties[591] while a doctor in a domestic 'practice' was exempt from being called up to serve in the army (presumably as a soldier, not a doctor) and also from having soldiers billeted on him.[592] However, whether there was a system for ensuring that the army had doctors we do not know.

Medicine in the army appears to have been more structured than in the domestic sphere. The doctors seem to have had ranks and these were, apparently, based on the skill level they had ranging from mere *capsarii* to the *medicus ordinarius.*[593] However, it has to be remembered that there was no standard training for doctors in the ancient world and that it is most likely that those who wanted to be doctors would follow an established doctor, like apprentices, in order to learn the skills necessary. It is possible that within the army those who started as *capsarius* could eventually rise to *medicus ordinarius* in the same way in which an ordinary soldier could rise to the rank of centurion.

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[591] CJ10.53(52). 1, 3rd C. AD in Campbell (1994) 104, see above p. 89 for discussion.
[592] Nutton (2004) 249.
[593] Nutton (2004) 181-182.

This could also have been an incentive to a young, ambitious, doctor, he could go in as a lower rank of doctor and come out with a rank which would command respect for his abilities and possibly increase the number of patients who sought treatment from him.

The question of who doctors were in both the domestic and army contexts remains hazy although what is clear is that the army had a more structured system. The domestic context appears to have been more relaxed, anyone, it seems, could set up as a doctor and even apply for tax immunity. There does not seem to have been a formal structure for learning medicine and Galen appears to have been the exception with his years of learning with a number of different doctors in a number of different places around the Mediterranean, although he does give the impression that studying with a specific teacher was normal.[594] There may have been opportunities for untrained men to learn medicine in the army and rise through the ranks but this too does not seem to be a formalised structure.

With the instruments the differences are almost non-existent between these two contexts. From both we have the 'basic kit', as laid out in Hippocrates.[595] This means that, along with the more specialised instruments, such as those for gynaecology and urology, all types of surgery as described in Celsus would have been possible, particularly in the domestic context, but even in the military context, when we look at the instruments found as a whole. There have even been some finds in the army context which would not be expected, such as the female catheter from Bad-Deutsch Altenburg.

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[594] Nutton (2004) 216-218.
[595] Jackson (1995) 193, see.

However, both the finds from the Vesuvian towns and those from forts have been evaluated in the light of pre-conceived assumptions. In the case of the Vesuvian towns it is that the sites were untouched until excavations began in the 18th century.[596] This has led to the further assumption that the finds are exactly what was left there and have not been disturbed or robbed in the intervening years. Yet this is not the case. This could explain the missing types from the Vesuvian towns. People may simply have gone back in for them after the end of the eruption and retrieved them. It is because the Vesuvian towns are not the undisturbed sites that they were thought to be that Rimini becomes especially important but we must keep in mind the difference in time with the Vesuvian towns being from the late first century AD while Rimini is from the mid third century. Rimini is an undisturbed site and, not only the sheer number of instruments found there, but also that they were excavated and recorded with modern archaeological techniques, means that we not only know which house they came from, but also where in that house they were found and which instruments they were found with. The recording of these finds is in contrast to the way in which the finds from the Vesuvian towns were treated.[597]

The assumption has been that medicine in the army would be primarily concerned with the treatment of wounds but, as has been discussed above, this is incorrect. The greater number of patients at most times is likely to have been sick and not injured and requiring medicines more than surgery. This explains the prevalence of the 'basic kit' types of instrument among those found in forts and fortresses and the lower numbers of instruments for bone surgery which could, on the model of medicine in the army being primarily concerned with

[596] Cooley (2003) 65.
[597] Cooley (2003) 76.

wounds and injuries sustained in battle, be expected. However, it must also be kept in mind that the basic instruments are smaller and, therefore, more likely to be overlooked than the larger, more robust, instruments for bone surgery. In the forts we possibly have some loss of instruments but mostly deliberate deposition of instruments by the army. I tend towards Bishop and Coulston's idea that they were left behind because they were broken and, therefore, scrap metal which could not be carried with the army when they left,[598] or were left on purpose in order to be there when the site was returned to at a later date. Baker, on the other hand, leans towards the idea that, since these items had been in contact with sick bodies, and potentially with people who were sick and had died, they had a special significance for the soldiers and were deposited for ritual reasons.[599] I feel that this is an easy option for which there is no evidence in the archaeology. Ritual purposes can cover anything that is unexplained or potentially inexplicable. Bishop and Coulston's argument is backed by archaeological evidence and, in the light of that evidence, seems like a more realistic option. In the case of the Vesuvian towns and Rimini the instruments were left as the result of a catastrophe situation, although it is more than likely that a large number of instruments were taken out of the Vesuvian towns before Vesuvius erupted and that some more may have been removed after the eruption. In Rimini the fire, which was hot enough to melt the instruments so that they fused with each other, would have precluded anyone attempting to go in and retrieve the instruments and the immediate back-filling of the house to strengthen the town wall means that what has been excavated is what was in the

[598] Bishop & Coulston (1993) 34-35.
[599] Baker (2004) 74-75.

house at the time of the fire, most likely a complete *instrumentarium.*[600] In the army the probability that the instruments found were not deposited where they were used has not always been taken into account.

The question of where medicine was practised in the ancient world is one without a firm answer. Celsus talks about using a well-lit room[601] but does not specify whether this is in the doctor's house, or the patient's, or elsewhere such as the baths. So we are left with the question of whether medicine was practised where instruments were found or elsewhere? In the case of Rimini, it is possible that medicine was practised in the house where the instruments were found, although the way in which they were stored suggests that they could easily be taken with the doctor when he went to a patient, instead of the patient always going to the doctor.[602] In addition, while they were all stored in a large room it is possible that the *cubiculum* off that room was also used for treating patients, or, more specifically, performing surgery. In the case of forts, as I have outlined above, it is likely that medicine was not practised where the instruments were found. This is more likely to be the case if the instruments were broken and awaiting repair or were deliberately buried in order to prevent the metal being found and used by enemies. In the case of the Corbridge Hoard[603] it is probable that they were collected together with other items which were either being readied for transport or burial and buried together.

Just as it is almost impossible to identify specific buildings where medicine was practised in the domestic context, it is also nearly impossible to do so in the army context. In all the cases which I have examined there is not

[600] Jackson (2003) 313-314.
[601] Celsus VII 7.14 C.
[602] Jackson (2003) 314.
[603] Bishop & Coulston (1993) 35, see above p.115.

enough evidence for the argument that a specific ground-plan was the hospital in every case.[604] I believe that each potential *valetudinarium* must be examined on the material evidence specific to the building and fort or fortress in question and in the context of the rest of the finds from the site since, as we have seen, the *'valetudinarium'* is often not the only place where instruments have been found within a site. Additionally, as has been shown above, it is possible that some of these buildings were actually stores as their ground plans are remarkably similar to those on the Marble Plan of Rome and the finds in some, for example Novae, of them point to this function.[605]

To a certain extent this thesis is inconclusive, but this was not entirely unexpected. When medicine in the domestic and army contexts are compared the lack of evidence is often a hindrance. However, where we do have sufficient evidence there are many similarities between the practice of medicine in these two very different environments. To a large extent the doctors will have been dealing with the same illnesses and broken bones and, thus, the instruments found are, for a large part, the same. It appears that the distinction between the practice of medicine in the army and domestic spheres might well have been blurred, in particular when the army was encamped for a long time or in a permanent fort or fortress. The way in which the doctors were organised appears to have been far more structured in the army than in the domestic context. There is some evidence for ranks equivalent to those held by soldiers being given to doctors and it is to be assumed that these ranks meant a similar pay structure to the soldiers. There is an overlap between the domestic and the army at this point with doctors spending time working in the army before going

[604] See p.116ff.
[605] See p. 120.

back to civilian life[606] and there were privileges attached to being a doctor, both in the army and the domestic spheres, in the Roman Empire. The major difference is in where medicine might have been practised. There is little evidence for hospitals in the domestic context; the literary sources do not mention civic hospitals and it seems that patients were treated in their own house or by a drug seller with the possibly of the baths being used by doctors for the practice of medicine. However, the latter is uncertain as the evidence is scarce and, once again, there is no literary evidence for it.[607] The greater structure of doctors in the army seems to have run, on occasion, to the provision of a *valetudinarium* in a fort but it is far to easy to say that each and every fort and fortress had a *valetudinarium.* It is far better to be cautious about the identification of a building as a *valetudinarium* and to ensure that such an identification is only made when taking into account the evidence for medical practice from the entire site.

This comparison of the material evidence for medical practice in the urban domestic and military spheres has brought up some interesting points about the similarities and differences in the circumstances in which doctors might have practiced, what their standing in society might have been, what conditions they might have come across and what instruments they may have used. Additionally, with respect to both instruments and *valetudinaria* it has been possible to see what might be a development over time. This is not surprising as it is human nature to constantly innovate but, so far, there has been very little evidence for this in Roman medicine.

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[606] See p.100ff.
[607] See p.74fF.

Appendix I

In this appendix I present the information contained in Bliquez's and Jackson's 1994 catalogues in such a way as to offer at-a-glance referencing in a way that they do not in the catalogues. This allows the quick understanding of how the instruments which have been discussed compare to the rest of the instruments of the same type in the Naples museum.

Exhibit = those instruments which were on display in the Naples Museum

Depository = this is in a long concrete chamber on the roof of the Naples Museum which is divided into twelve small cells.

Antiquarium = the "Antiquarium" at Pompeii

1.1 Probes

No.	*Instrument*	*Sub-Type*	**Bliquez Cat. No.**	*Provenance*	**Location**
1	Probe?	Simple	204	Pompeii	Exhibit
2	Probe?	Simple	205	Pompeii	Exhibit
3	Probe	Simple	206	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit
4	Probe?	Simple	207	Unknown	Exhibit
5	Probe?	Simple with finial	208	Unknown	Exhibit
6	Probe	Double “olivary”	209	Unknown	Exhibit
7	Probe	Double “olivary”	210	Unknown	Exhibit
8	Probe	Double “olivary”	211	Unknown	Exhibit
9	Probe	Double “olivary”	212	Unknown	Exhibit
10	Probe?	Double “olivary”	213	Pompeii, VIII 7, 5 metalworker’s shop by the Porta Stabiana.	Exhibit
11	Probe	Olivary probably with a spatula or scoop on opposite end. Was in A7.	A11	Pompeii, I 10, 7 House of M. Velusius Iuvencus.	Antiquarium
12	Double-ended probe	Round stem tapers to a simple point at each end.	A56	Unknown	Antiquarium

1.2 Cauteries

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
1	Cautery	103	Pompeii	Exhibit	Square at base, rounded at end, sharply offset from handle.
2	Cautery	104	Pompeii	Depository	As 103
3	Cautery?	105	Borgia Collection	Depository	Shaped like a small fork with very small tines.
4	Cautery?	106	Herculaneum	Exhibit	Hexagonal plate mounted at an angle to a long handle terminating in a finial.
5	Cautery?	A57	Unknown	Antiquarium	Simple tanged instrument with angles, rounded-rectangular plate.

1.3 Needles

No.	**Instrument**	**Bliquez Cat. No.**	**Provenance**	**Location**	**Decoration**
1	Needle	219	Pompeii, IX 9. 3-5 Casa del Medico Nuovo (II).	Exhibit	Round shaft, one eye.
2	Cataract needle	220	Pompeii, IX 9. 3-5 Casa del Medico Nuovo (II).	Exhibit	Straight shaft decorated with fine lattice pattern; finial at one end; moulded rings and needle at other.
3	Needle holder	221	Pompeii	Depository	Shaft decorated with

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
					three sets of moulded rings and a fine lattice pattern; sockets decorated with striation.
4	Needle holder	222	Pompeii	Depository	As 221 but without moulded rings and one socket at angle to shaft.
5	Needle holder	223	Pompeii	Depository	As 221 but on socket at angle to shaft.
6	Needle holder	224	Unknown	Depository	As 221 but with simpler ring pattern and one socket at angle to shaft.
7	Needle holder	225	Unknown	Depository	Only one socket decorated with a dot pattern and rings; other end a probe decorated with striation.
8	Needle holder	226	Unknown	Depository	As 221 but with two sets of the rings more simply designed and one socket at an angle to the shaft.
9	Needle holder	227	Unknown	Exhibit	As 221 but one socket at an angle to the shaft.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
10	Needle holder	228	Pompeii	Exhibit	As 221 but with a broad lattice pattern instead of fine one and one socket an angle to shaft.
11	Needle holder	229	Unknown	Depository	As 221 but striation omitted.
12	Needle holder	230	Pompeii	Exhibit	Only one socket decorated with rings, fine lattice pattern and striation. Below rings shaft decorated with striation.
13	Needle holder	A2	Pompeii II 4, 1-12. Was in A1.	Antiquarium	Double-ended with one straight and one angled socket. Central multiple ring moulding and similar dividing sockets from stem. Fine lattice pattern on stem.
14	Needle holder/probe	A9	Pompeii I 10, 7 House of M. Velusius Iuvencus. Found in A7.	Antiquarium	Double-ended with ring moulding separating needle socket from stem which is broken but probably tapered to a simple probe.
15	Cataract needle	A10	Pompeii I 10, 7 House	Antiquarium	Olivary terminal

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
			of M. Velusius Iuvencus. Found in A7.		beyond a ring-and-barrel moulding. At other end, beyond a fat ring moulding. the remains of or slender, round tapered needle.
16	Needle or eyed probe	A14	Pompeii I 11, 9.15 Casa del Primo Piano. Now in A12.	Antiquarium	Round upper stem flattened around the eye, lower stem is four-sided and tapers to a sharp point.
17	Needle or eyed probe	A15	Pompeii I 11, 9.15 Casa del Primo Piano. Now in A12.	Antiquarium	As A14 but slightly larger.
18	Needle or eyed probe	A17	Pompeii I 11, 9.15 Casa del Primo Piano. Now in A12.	Antiquarium	Plain round stem broken at the eye.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
19	Needle holder	A18	Unknown. Found with A19-A20.	Antiquarium	Double-socketed example. Central multiple ring moulding. Fine lattice pattern. Simple ring moulding separates each end of stem from needle sockets. The complete socket is angled, the other is broken just beyond the moulding and was probably straight.
20	Needle holder	A27	Pompeii, Piazzale Anfiteatro.	Antiquarium	Slender round stem broken at multiple ring moulding. Similar moulding divides the stem from a straight tubular socket.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
21	Cataract needle	A35	Pompeii II 2, 2 Garden attached to the Casa di D. Octavius Quartio.	Antiquarium	Stem textured with fine lattice pattern. Multiple ring and baluster moulding surmounted by olivary terminal at upper end. At lower end the slender round needle is divided from the stem by a small multiple ring moulding.
22	Needle handle?? Traction hook holder	A50	Unknown	Antiquarium	Round handle with ring and baluster terminal.
23	Needle holder/ Probe	A51	Pompeii I 13, 2 House of Sutoria Primigenia.	Antiquarium	Combination instrument. Linear faceted stem divided into two unequal parts by a double ring and squat baluster moulding. Longer part tapers to a simple point. Shorter part swells gently to form a slender, elongated conical socket whose end is angled to one side.

1.4 Hooked Instruments

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
1	Retractor	60	Unknown	Exhibit	'Baluster' finial, stration on handle, moulded rings, striation on shaft.
2	Retractor	61	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	Finial as 60, broad lattice pattern handle.
3	Retractor	62	Pompeii	Exhibit	Finial as 60, handle fine lattice pattern, moulded rings; shaft, fine lattice pattern and striation.
4	Retractor	63	Unknown	Exhibit	Finial as 60, decor of handle and shaft as 62.
5	Retractor	64	Unknown	Exhibit	Finial as 60, plain handle, moulded rings, striation on shaft.
6	Retractor	65	Pompeii	Exhibit	Finial as 60, hand and shaft as 64.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
7	Retractor	66	Pompeii	Exhibit	Finial as 60 , upper handle fine lattice pattern, moulded rings, fine lattice pattern and striation on shaft.
8	Retractor	67	Pompeii	Exhibit	Finial as 60, decor concealed by encrustation except for moulded rings.
9	Retractor	68	Unknown	Exhibit	'Door-knob' finial, moulded rings, shaft square in section.
10	Retractor	69	Pompeii	Exhibit	Finial as 60, plain handle, moulded rings, shaft square in section.
11	Retractor	70	Pompeii	Exhibit	Finial as 60, handle plain, moulded rings, striation on shaft.
12	Retractor	71	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	'Door-knob' finial, broad lattice pattern handle, moulded rings, striation on shaft.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
13	Retractor	72	Unknown	Exhibit	Finial as 71, decor concealed by encrustation except for moulded rings.
14	Retractor	73	Unknown	Exhibit	Finial as 71, no moulded rings, striation from finial to base.
15	Retractor	74	Pompeii, IX 3, 5.24 House of Marcus Lucretius.	Exhibit	Finial and decor as 71.
16	Retractor	75	Unknown	Exhibit	Finial as 71, fine lattice pattern on handle, moulded rings, fine lattice pattern and striation on shaft.
17	Retractor	76	Pompeii	Exhibit	Elaborate multi-tiered finial, handle contracts in middle followed by moulded rings, shaft plain.
18	Retractor	77	Unknown	Exhibit	Finial, handle and decor like 76.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
19	Retractor	78	Unknown	Exhibit	Finial as 71, fine lattice pattern on handle, moulded rings, fine lattice pattern, incised rings, striation on shaft.
20	Retractor	79	Unknown	Exhibit	Finial, handle, shaft as 78.
21	Retractor/Ligula	80	Pompeii	Exhibit	Moulded rings as decor.
22	Retractor/Needle holder	81	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	Hollow end decorated with incised rings, shaft has striation.
23	Spindle hook	82	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	None.
24	Embryo hook	83	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	Moulded rings at both end of handle.
25	Embryo hook	84	Pompeii, probably VIII 3, 10-12 House of the Medicus A. Pumponius Magonianus.	Exhibit	Globe finial, moulded rings, striation and moulded rings at base.
26	Embryo hook	85	Unknown	Exhibit	Fine lattice patter with moulded rings at each end.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
27	Embryo hook	86	Pompeii, probably VIII 3, 10-12 House of the Medicus A. Pumponius Magonianus.	Depository	Close diagonal striation flanked by moulded rings.
28	Embryo hook ?	87	Pompeii, if a true embryo hook, probably VIII 3, 10-12 House of the Medicus A. Pumponius Magonianus.	Depository	Finial in shape of a covered vase with incised decor, handle decorated as a 'knotty club'.
29	Embryo hook ?	88	Pompeii, if a true embryo hook, probably VIII 3, 10-12 House of the Medicus A. Pumponius Magonianus.	Depository	Finial/handle as 60-73 but more elaborate and compressed.
30	Hook-like object of undetermined purpose	89	Pompeii	Depository	Incised dots on upper shaft by knob-like termination.
31	Hook-like object of undetermined purpose	90	Pompeii, VI 14, 7 a shop on the Via della Fortuna.	Depository	Incised striation on knob-like termination.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
32	Sharp hook	A34	Pompeii II 2, 2.	Antiquarium	Bossed head with fine lattice pattern between it and the ring mouldings on the stem. Below the mouldings the stem is octagonal.
33	Bifurcated hook	A52	Pompeii, pistrinum (mill) on the Via Nola.	Antiquarium	Slender round handle surmounted by a large domed know with engraved “rayed” decoration and multiple ring neck moulding. At the opposite end, beyond a small multiple ring moulding is a flat plate. Only the base of the bifurcated hook which extended from this plate survives.
34	Eyelid retractor?	A53	Unknown	Antiquarium	Broad blunt hook with elliptical leading edge and round slender tapered stem.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
35	Eyelid retractor?	A54	Unknown	Antiquarium	Similar to A53.
36	Blunt hook	A55	Unknown	Antiquarium	Similar to A53 but the hook is at a more acute angle and has a small knob at the centre of its lunate leading edge.

1.5 Forceps and tweezers

No.	*Instrument*	Bliquez Cat. No.	*Provenance*	Location	*Design*
1	Forceps	242	Pompeii	Exhibit	Two elements riveted together. Curved jaws are serrated; lower handles beautifully worked.
2	Forceps	243	Borgia Collection.	Exhibit	Two elements riveted together. Spoon-shaped jaws serrated along edges and pierced. Lower handles nicely worked.
3	Forceps	244	Pompeii	Exhibit	Two elements riveted together. Serrated jaws curve inward to meet.
4	Forceps	245	Probably Herculaneum.	Exhibit	One-piece arrangement with sliding catch. Squarish remnant of finial; broad serrated jaws.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
5	Forceps	246	Pompeii	Exhibit	One piece. Multi-tiered moulded finial, some moulding on upper legs. Serrated jaws.
6	Forceps	247	Unknown	Exhibit	One piece. Rotund finial; serrated incurving jaws.
7	Forceps	248	Unknown	Exhibit	As 247.
8	Forceps	249	Unknown	Exhibit	As 247.
9	Forceps	250	Unknown	Exhibit	As 247.
10	Forceps	251	Unknown	Exhibit	As 247.
11	Forceps	252	Pompeii	Exhibit	As 247.
12	Forceps	253	Pompeii	Exhibit	One piece, simple profile; incurving serrated jaws.
13	Forceps	254	Pompeii	Exhibit	As 253.
14	Forceps	255	Pompeii	Exhibit	As 253 but with moulded or stamped parallel lines decorating the outside of both legs.
15	Forceps	256	Pompeii, IX 1. 12 unnamed house on Via Stabiana.	Exhibit	One piece, legs narrow in profile as they meet below baluster-like finial; incurving jaws are serrated.
16	Forceps	257	Unknown	Exhibit	As 256.
17	Forceps or tweezers	258	Pompeii, probably work of Agathangelus, see Bliquez (1994) 59.	Exhibit	One piece, straight legs contract in profile before meeting toward looped head; legs equipped with rather long teeth.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
18	Forceps or tweezers	259	Pompeii, work of Agathangelus.	Exhibit	As 258 but with the inscription AGATHGELUS F stamped on one side.
19	Forceps or tweezers	260	Pompeii, either IX 1, 17-19 House of Lollia Successa or IX 1, 22.29.	Exhibit	As 253 but legs contract in size at a sharp angle before squared unserrated jaws curve together.
20	Forceps or tweezers	261	Unknown	Exhibit	As 256 except incurving squared jaws are unserrated.
21	Forceps or tweezers	262	Unknown	Exhibit	As 261.
22	Forceps or tweezers	263	Unknown	Exhibit	As 261 except jaws are pointed and do not curve inwards.
23	Forceps or tweezers	264	Unknown	Exhibit	As 263.
24	Forceps or tweezers	265	Pompeii	Exhibit	One piece; profile of legs expands at an angle about one third of the way down; incurving squared jaws unserrated.
25	Forceps or tweezers	266	Unknown	Exhibit	As 265.
26	Forceps or tweezers	267	Pompeii, VII 5, 39 House of Acceptus and Euhodia.	Exhibit	As 265.
27	Forceps or tweezers	268	Pompeii	Exhibit	As 265.
28	Forceps or tweezers	269	Pompeii, IX 7, 5 House of M. Vecilius Verecundus.	Exhibit	As 265 but width of legs contracts toward rounded jaws.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
29	Tweezers	270	Unknown	Exhibit	Shaped like 269 with the addition of incised lines following the edges as decoration.
30	Tweezers	271	Unknown	Exhibit	One piece arrangement with ring for accessories. Broad straight legs; slightly incurving unserrated jaws; sliding catch.
31	Tweezers	272	Unknown	Exhibit	As 271 but without ring and catch.
32	Tweezers	273	Unknown	Exhibit	One piece arrangement. Broad legs expanding toward incurve unserrated jaws. Ring loop.
33	Tweezers	274	Pompeii	Exhibit	As 272 but broader and shorter.
34	Tweezers	275	Unknown	Exhibit	As 272 but sides taper slightly inward and ring loop very long. Two superimposed sets of circles stamped as decor.
35	Tweezers	276	Unknown	Exhibit	As 273 but narrower legs.
36	Tweezers	277	Pompeii	Exhibit	As 273 but narrower legs.
37	Tweezers	278	Pompeii	Exhibit	As 273.
38	Tweezers	279	Unknown	Exhibit	As 273.
39	Tweezers	280	Pompeii, I 4, 9 unnamed house on the Via Stabiana.	Exhibit	As 273.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
40	Tweezers	281	Unknown	Exhibit	As 273.
41	Tweezers	282	Unknown	Exhibit	As 273.
42	Tweezers	283	Unknown	Exhibit	As 273 but one leg does not curve in towards jaw.
43	Tweezers	284	Pompeii VII 1, 36.37 House of L. Modestus or Vii 2, 48.49 House of D. Caprasius Primus.	Exhibit	Two straight legs terminating in broad flat serration surmounted by a broad flat loop.
44	Tweezers	285	Unknown	Exhibit	Straight legs; large ring loop; a few incised lines for decor on top of loop.
45	Tweezers	286	Unknown	Exhibit	As 285 but without incised lines.
46	Tweezers	287	Pompeii	Exhibit	One piece arrangement. Broad legs descending from ring loop expand into large jaws which barely curve inward and are not serrated; some notches punched along edges of jaws.
47	Tweezers	288	Pompeii	Exhibit	As 287.
48	Tweezers	289	Unknown	Exhibit	As 287.
49	Tweezers	290	Unknown	Exhibit	As 287.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
50	Forceps	A8	Pompeii I 10,7. House of M. Velusius Iuvencus. Found in A7.	Antiquarium	Simple U-spring forceps with plain shouldered arms. Jaw tips are broken but slight inward turn of one jaw indicates it was a toothed or smooth-jawed fixation forceps.
51	Fixation forceps	A25	Pompeii, Piazzale Anfiteatro.	Antiquarium	Plain shouldered arms terminate in square, inturned jaws. Double ring and baluster finial embellished with engraved rings which may have had silver wire inlay.
52	Fixation forceps	A26	Pompeii, Piazzale Anfiteatro.	Antiquarium	Almost identical to A25.

1.6 Scalpels and Dissectors

* = not quite Type I but close enough to be counted as such see discussion in Ch.2

No.	**Instrument**	**Sub-type**	**Bliquez Cat. No.**	**Provenance**	**Location**
1	Scalpel/Dissector	Type I	14	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit
2	Scalpel/Dissector	Type I	15	Pompeii	Exhibit
3	Scalpel/Dissector	Type I	16	Pompeii	Exhibit
4	Scalpel/Dissector	Type I	17	Pompeii	Exhibit
5	Scalpel/Dissector	Type I	18	Pompeii	Exhibit

No.	Instrument	Sub-type	Bliquez Cat. No.	Provenance	Location
6	Scalpel/Dissector	Type I	19	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit
7	Scalpel/Dissector	Type I	20	Pompeii, IX, 3, 5.24 House of Marcus Lucretius.	Exhibit
8	Scalpel/Dissector	Type I	21	Pompeii	Exhibit
9	Scalpel/Dissector	Type I	22	Unknown	Exhibit
10	Scalpel/Dissector	Type 1	23	Unknown	Exhibit
11	Scalpel/Dissector	Type I	24	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	.Exhibit
12	Scalpel/Dissector	Type I	25	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit
13	Scalpel/Dissector	Type I	26	Pompeii, IX 3, 5.24 House of Marcus Lucretius.	Exhibit
14	Scalpel/Dissector	Type I	27	Unknown	Exhibit
15	Scalpel/Dissector	Type I	28	Pompeii	Exhibit
16	Scalpel/Dissector	Type I	29	Unknown	Exhibit
17	Scalpel/Dissector	Type I	30	Pompeii	Depository
18	Scalpel/Dissector	Type I	31	Unknown	Depository
19	Scalpel/Dissector	Type I	32	Unknown	Depository
20	Scalpel/Dissector	Type II	33	Unknown	Depository
21	Scalpel/Dissector	Type II	34	Unknown	Depository
22	Scalpel/Dissector	Type II	35	Unknown	Depository
23	Scalpel/Dissector	Type II	36	Unknown	Depository
24	Scalpel/Dissector	Type I*	37	Unknown	Depository

No.	Instrument	Sub-type	Bliquez Cat. No.	Provenance	Location
25	Scalpel/Dissector	Type I*	38	Pompeii, a house near the Stabian Baths.	Depository
26	Dissector	Type I*	39	Pompeii	Depository
27	Scalpel	Hercules	40	Pompeii	Exhibit
28	Scalpel	Hercules	41	Pompeii, III 7, 5 a metal worker's shop by the Porta Stabiana.	Exhibit
29	Scalpel	Hercules	42	Pompeii	Depository
30	Scalpel	Hercules	43	Pompeii	Depository
31	Scalpel	'Chess Piece'	44	Unknown	Exhibit
32	Scalpel	'Chess Piece'	45	Unknown	Depository
33	Scalpel	'Chess Piece'	46	Unknown	Depository
34	Scalpel	'Chess Piece'	47	Unknown	Depository
35	Scalpel	'Chess Piece'	48	Unknown	Depository
36	Scalpel	'Chess Piece'	49	Unknown	Depository
37	Scalpel	'Chess Piece'	50	Unknown	Depository
38	Scalpel	Bolt-shaped, poss knotted club protuberances	51	Unknown	Depository
39	Scalpel/Dissector	Blade and shaft one piece	52	Unknown	Exhibit
40	Scalpel handle?	Type 1* with multiple ring moulding.	A20	Unknown	Antiquarium
41	Scalpel	Type 1	A21	Pompeii Piazzale Anfiteatro.	Antiquarium
42	Scalpel	Type I	A22	Pompeii Piazzale Anfiteatro.	Antiquarium

No.	Instrument	Sub-type	Bliquez Cat. No.	Provenance	Location
43	Scalpel	Type I	A23	Pompeii Piazzale Anfiteatro.	Antiquarium
44	Scalpel	Type I	A24	Pompeii Piazzale Anfiteatro.	Antiquarium
45	Graded set of scalpels	Type I	A28-A33	Presumably Pompeii II 2, 2 garden attached to the Casa di D. Octavius Quartio.	Antiquarium
46	Scalpel handle	Type I	A36	Unknown	Antiquarium
47	Scalpel handle	Type I	A37	Unknown	Antiquarium
48	Scalpel handle	Type I	A38	Unknown	Antiquarium
49	Scalpel handle	Type I	A39	Unknown	Antiquarium
50	Scalpel handle	Type I	A40	Unknown	Antiquarium
51	Scalpel handle	Type I *	A41	Pompeii I 10, 7 House of M Velusius Iuvencus.	Antiquarium
52	Scalpel handle?	Type I*	A42	Unknown	Antiquarium
53	Scalpel handle	Grip oval in section with engraved acanthus leaves or feathers.	A43	Unknown	Antiquarium
54	Scalpel handle?	Type I*	A 44	Pompeii I ii, 6.7 House of Maximus.	Antiquarium
55	Scalpel handle	Type I*	A45	Pompeii, Reg. VI.	Antiquarium
56	Scalpel handle	Type I*	A46	Pompeii II 4, 2.3 Casa del Moralista.	Antiquarium

No.	Instrument	Sub-type	Bliquez Cat. No.	Provenance	Location
57	Scalpel handle	Type I*	A47	Boscoreale "La Pisanella".	Antiquarium
58	Scalpel handle ?	Type I*	A48	Pompeii I 13, 2 House of Sutoria Primigenia.	Antiquarium

1.7 Other Cutting Instruments

No.	Instrument	Sub-type	Bliquez Cat. No.	Provenance	Location
1	Phlebotome		53	Pompeii, VI 1, 9.10.23 House of the Surgeon.	Depository
2	Phlebotome ?		54	Borgia Collection.	Depository
3	Phlebotome		55	Borgia Collection.	Depository
4	Phlebotome		56	Probably Pompeii.	Depository
5	Phlebotome ?		57	Unknown	Exhibit
6	Bow Shears		58	Pompeii	Exhibit
7	Object of unknown purpose	Blade/plate with incised decor	59	Naples, Via Santa Teresa, 21 April 1827.	Exhibit

1.8 Elevators and Chisels

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
1	Bone elevator	91	Pompeii	Exhibit	Plain handle.
2	Bone elevator	92	Pompeii	Exhibit	Handle has fine lattice pattern flanked by moulded rings.
3	Bone elevator	93	Pompeii	Depository	Handle has fine lattice pattern flanked by moulded rings.

No.	Instrument	Bliquez Cat. No.	Provenance	Location	Decoration
4	Chisel	94	Pompeii	Depository	Plain handle tapers to middle.
5	Chisel	95	Unknown	Depository	Handle octagonal in section.
6	Chisel ?	96	Pompeii	Depository	Handle as 94.
7	Chisel ?	97	Pompeii	Depository	Handle as 94.
8	Chisel ?	98	Pompeii	Exhibit	Handle as 94.
9	Chisel ?	99	Unknown	Depository	Handle in shape of thick bolt with moulded rings.
10	Chisel ?	100	Unknown	Depository	Handle like 99.
11	Chisel ?	101	Unknown	Depository	Handle similar to 99.
12	Chisel ?	102	Pompeii	Depository	Handle like 95 but tapers towards middle.
13	Bone elevator	A19	Unknown	Antiquarium	Only central handle remains. Central ring moulding with rectangular grip either side.

1.9 Specula

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
1	Vaginal speculum	291	Pompeii, probably VIII 5, 24 Casa del Medico Nuovo (I).	Exhibit	Quadrivalve priapiscus expanded by a screw mechanism turning anticlockwise. Two lower blades supported by bars decorated from top to bottom in an incised feather pattern. These are connected to a crossbar with finials in the shape of rams' heads. Less robust and less carefully finished than the two trivalve specula.
2	Vaginal speculum	292	Pompoeii, VIII 3, 101-12 House of the medicus A. Pumponius Magonianus.	Exhibit	Trivalve priapiscus expanded by a screw mechanism turning clockwise; the threading of the screw is a finer gauge than that of 293. Bars supporting upper two blades are riveted to smaller bars, grips for steadying the instrument, in the shape of snakes. The handle which turns the screw is richly decorated with an acanthus leaf pattern surmounting a series of rings.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
3	Vaginal speculum	293	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	Arrangement, decor and operation as 292 except that the handle is surmounted by a more complex ring arrangement and lacks the acanthus pattern. There are small differences in the decor of the snake grips.
4	Rectal speculum	294	Pompeii, probably IX 9, 3-5 Casa del Medico Nuovo (II).	.Exhibit	Two separate elements connected by and revolving on a central rivet; decor consists simply of raised moulding extending from the base of the priapiscus to a little past the rivet where it terminates in the shape of a triangle. Handles triangular in section.
5	Rectal speculum	295	Probably Herculaneum	Exhibit	As 294 but without moulding.

1.10 Spatulae

No.	**Instrument**	**Subtype**	**Bliquez Cat. No.**	**Provenance**	**Location**	**Details**
1	Spatula	Oval type	107	Pompeii IX 1,27 a shop near the House of Epidius Rufus.	Exhibit	Plain
2	Spatula	Oval type	108	Unknown	Exhibit	Striation on handle.
3	Spatula	Oval type	109	Unknown	Exhibit	Striation on handle.
4	Spatula	Oval type	110	Unknown	Exhibit	Striation on handle.

No.	Instrument	Subtype	Bliquez Cat. No.	Provenance	Location	Details
5	Spatula	Oval type	111	Unknown	Exhibit	Striation on handle.
6	Spatula	Oval type	112	Pompeii, VI 14.6 a shop on the Via della Fortuna.	Exhibit	Striation on handle.
7	Spatula	Oval type	113	Unknown	Exhibit	Striation on handle.
8	Spatula	Oval type	114	Unknown	Exhibit	Striation on handle.
9	Spatula	Oval type	115	Pompeii	Exhibit	Striation on handle.
10	Spatula	Oval type	116	Unknown	Exhibit	Striation on handle.
11	Spatula	Oval type	117	Unknown	Exhibit	Striation on handle.
12	Spatula	Oval type	118	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	Striation on handle.
13	Spatula	Oval type	119	Unknown	Exhibit	Striation on handle.
14	Spatula	“Fish” type	120	Pompeii, VI 14, 7 a shop on the Via della Fortuna.	Exhibit	Plain.
15	Spatula	“Fish” type	121	Unknown	Exhibit	Striation on handle.
16	Spatula	“Fish” type	122	Unknown	Exhibit	Striation on handle.
17	Spatula	“Fish” type	123	Unknown	Exhibit	Striation on handle.
18	Spatula	“Fish” type	124	Pompeii	Exhibit	Striation on handle.
19	Spatula	“Fish” type	125	Unknown	Exhibit	Striation on handle.
20	Spatula	“Fish” type	126	Unknown	Exhibit	Striation on handle.
21	Spatula	“Fish” type	127	Unknown	Exhibit	Striation on handle.
22	Spatula	“Fish” type	128	Pompeii	Exhibit	Striation on handle.
23	Spatula	Slender “lancet” type	129	Unknown	Exhibit	Plain.
24	Spatula	Slender “lancet” type	130	Unknown	Exhibit	Striation on handle.

No.	Instrument	Subtype	Bliquez Cat. No.	Provenance	Location	Details
25	Spatula	Slender "lancet" type	131	Pompeii, VI 13, 16 House of P. Gavius Proculus.	Exhibit	Plain.
26	Spatula	"Olive leaf" type	132	Unknown	Exhibit	Moulded rings at base of handle, striation on handle.
27	Spatula	Variation on the oval type, rather like a duck's bill.	133	Unknown	Exhibit	Plain.
28	Spatula	Spatula shape of a spade, handle and "olivary" enlargement flat.	134	Pompeii	Exhibit	Linear incised decor at mid-handle.
29	Spatula	Lengthened version of slender "lancet" type.	135	Unknown	Exhibit	Twisted handle with hole at the end.
30	Spatula	Spatula a compressed version of 135.	136	Unknown	Exhibit	Twisted handle ends in a pyramidal finial.
31	Spatula	Spatula as 135.	137	Unknown	Depository	Twisted handle and finial as 136.
32	Spatula	Spatula as 137 but with incised line following the edge.	138	Unknown	Depository	Handle round and plain with finial in shape of a bolt's head.
33	Double Spatula	Spatulae compressed variations of the "fish" type.	139	Pompeii	Exhibit	Striation on handle with thin moulded ring at mid-point.

No.	Instrument	Subtype	Bliquez Cat. No.	Provenance	Location	Details
34	Handle, probably for a ladle	Two spatula-type plates shaped like garfish snouts with incised line following edges, one terminates in head and neck of a snake.	140	Pietrabbondante	Exhibit	Below each “spatula” are moulded rings.
35	Double Spatula	Spatulae of the “fish” type.	141	Pompeii	Exhibit	Striation on swelling handle.
36	Double Spatula	Spatulae of the “fish” type.	142	Probably the same as 139 and 141.	Exhibit	Striation on handle with large moulded ring at mid-point.
37	Double spatula ?	Two crude round terminations.	143	Unknown	Exhibit	Shaft tapers towards middle.
38	Spatula ?	Rectangular spatula attached to a flat handle.	144	Pompeii, VII 2, 6 House of Terentius Neo and Proculus.	Exhibit	Incised triangles at base of spatula, superimposed semi-circles at its tip.

1.11 Spoons and Ligulae

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
1	Cyathiscomele	145	Unknown	Exhibit	Oblong spoon, round in section, flatted at top, mounted above moulded rings; shaft features striation, terminates in olivary enlargement.
2	Cyathiscomele	146	Unknown	Exhibit	As 145 but with spiral threading on shaft for silver inlay.
3	Cyathiscomele	147	Unknown	Exhibit	As 145.
4	Cyathiscomele	148	Unknown	Exhibit	As 145.
5	Cyathiscomele	149	Pompeii probably VII 2, 18.19.42.43 Hous of C. Vibius.	Exhibit	As 145.
6	Cyathiscomele	150	Unknown	Exhibit	As 145 but spoon is rounded at top.
7	Cyathiscomele	151	Unknown	Exhibit	As 150.
8	Cyathiscomele	152	Pompeii, a shop on the Via Stabiana.	Exhibit	As 150.
9	Cyathiscomele	153	Pompeii perhaps IX 6, 7 House of Oppius Gratus.	Exhibit	As 145.
10	Cyathiscomele	154	Unknown	Exhibit	As 145.
11	Cyathiscomele	155	Probably Pompeii.	Exhibit	Ovular spoon angular in section surmounts a large moulded ring.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
12	Cyathiscomele	156	Unknown	Exhibit	Ovular spoon angular in section surmounts large moulded ring.
13	Cyathiscomele	157	Unknown	Exhibit	As 145.
14	Cyathiscomele	158	Pompeii	Exhibit	As 150.
15	Cyathiscomele	159	Unknown	Exhibit	As 150.
16	Cyathiscomele	160	Pompeii IX 5, 9 House of Poppaeus Sabinus.	Exhibit	As 150.
17	Cyathiscomele	161	Pompeii	Exhibit	As 150.
18	Cyathiscomele	162	Pompeii, perhaps a shop on the Via della Fortuna.	Exhibit	As 150.
19	Cyathiscomele	163	Pompeii VI 13, 16 House of P. Gavius Proculus.	Exhibit	As 150.
20	Cyathiscomele	164	Unknown	Exhibit	As 150.
21	Cyathiscomele	165	Unknown	Exhibit	As 145.
22	Cyathiscomele	166	Unknown	Exhibit	As 145.
23	Cyathiscomele	167	Unknown	Exhibit	As 146, one of seven instruments in 306.
24	Cyathiscomele	168	Unknown	Exhibit	As 146.
25	Cyathiscomele	169	Pompeii, vicinity of the Temple of Venus.	Exhibit	As 150.
26	Cyathiscomele	170	Unknown	Exhibit	As 150.
27	Cyathiscomele	171	Unknown	Exhibit	As 150.
28	Cyathiscomele	172	Unknown	Exhibit	As 145.
29	Cyathiscomele	173	Unknown	Exhibit	As 150.
30	Cyathiscomele	174	Pompeii, perhaps IX 6, 7 House of Oppius Gratus.	Exhibit	As 150.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
31	Cyathiscomele	175	Unknown	Exhibit	Upper part of spoon broken.
32	Cyathiscomele	176	Unknown	Exhibit	Upper part of spoon broken off.
33	Cyathiscomele	177	Pompeii	Exhibit	As 150.
34	Cyathiscomele	178	Unknown	Exhibit	As 150 but with threaded handle for silver inlay.
35	Cyathiscomele	179	Unknown	Exhibit	As 150.
36	Cyathiscomele	180	Unknown	Exhibit	As 150.
37	Cyathiscomele	181	Unknown	Depository	As 150 but spoon angular in section.
38	Cyathiscomele	182	Pompeii	Depository	Small deep ovular spoon; moulded rings toward mid-shaft. One of three instruments originally contained in 299.
39	Cyathiscomele	183	Pompeii, V 3, 5 shop on the Via Nola.	Depository	Long oblong spoon; large moulded globe toward upper shaft.
40	Cyathiscomele	184	Unknown	Exhibit	Spoon shaped rather like a fish, as the spatulae 120-128.
41	Ligula	185	Unknown	Exhibit	Scoop at angle to swelling shaft marked by striation.
42	Ligula	186	Unknown	Exhibit	As 185.
43	Ligula	187	Unknown	Exhibit	As 185.
44	Ligula	188	Pompeii	Exhibit	As 185.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
45	Ligula	189	Pompeii, IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	As 185. One of seven instruments originally contained in 304.
46	Ligula	190	Pompeii	Exhibit	As 185.
47	Ligula	191	Unknown	Exhibit	As 185.
48	Ligula	192	Unknown	Exhibit	As 185.
49	Ligula	193	Unknown	Depository	As 185.
50	Large ligula?	194	Pompeii VI 11 close to the House of the Labyrinth.	Depository	Three-cornered round scoop or plate mounted at angle to plain shaft tapering to a sharp point; incised or stamped lines at neck of shaft.
51	Large ligula?	195	Pompeii	Exhibit	Round scoop or plate set at angle to shaft which tapers to a sharp point.
52	Large ligula?	196	Pompeii, perhaps a shop on the Via della Fortuna.	Exhibit	As 195 but without incised lines.
53	Large ligula?	197	Unknown	Exhibit	As 196.
54	Ear spoon	198	Unknown	Depository	Oblong spoon mounted on straight shaft coming to a point.
55	Ear spoon	199	Pompeii, possibly “VII”.	Depository	As 198.
56	Spoon	200	Unknown	Depository	Round bowl; shaft ends in a point.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
57	Spoon	201	Borgia collection.	Exhibit	Round bowl with incised decor resembling a flower or rosette on back; cylindrical handle with incised palmette and moulded rings.
58	Spoon	202	Unknown	Exhibit	Shaped like a square shovel; incised chevrons on shaft; handle in the shape of the bust of a woman..
59	Spoon	203	Borgia collection.	Depository	Egg-shaped spoon; twisted handle terminates in ram's head finial.
60	Ligula	A3	Pompeii II 4, 1-12, Villa di Giulia Felice. Found in A1.	Antiquarium	Plain slender octagonal stem with "olivary" probe at opposite end to angled disk.
61	Cyathiscomele	A4	As A2.	Antiquarium	Round stem with spiralled silver wire inlay and bulbous "olivary" terminal. At other end, beyond ring and band moulding, is a slender scoop with squared end.

No.	*Instrument*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
52	Cyathiscomele	A5	As A2.	Antiquarium	As A4 but longer and with more elaborate mouldings. "Olive" is smaller and the end of the scoop is less markedly squared off.
53	Cyathiscomele	A6	As A2.	Antiquarium	As A5 but longer and with slightly different mouldings.
54	Ligula	A13	Pompeii I ii, 9.15 Casa del Primo Piano. Now in A12.	Antiquarium	Plain, round, tapered stem, one end broken, at other a small angled disk.
55	Cyathiscomele	A16	As A13.	Antiquarium	Plain round stem with blunt-ended olivary terminal. At the other end the stub of the broken scoop is visible.

1.12 Carrying Cases for Instruments and Medicaments

No.	*Item*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
1	Box for medicines.	296	Pompeii V 5, 1.2 Casa del Medico dei Gadiatori.	Exhibit	Rectangular box with sliding lid held in place by a catch. Four compartments inside each covered with a lid capable of being raised by a handle. Incised lines parallel with borders decorate each lid. In each compartment are pills and fragments of pills.
2	Box for medicines or cosmetics.	297	Pompeii Vi 14, 27 House of M. Memmius Auctus.	Depository	Rectangular box with sliding lid held in place by a catch. Lid surmounted on one side with a decorative cornice, round opening on the side with the catch.
3	Cylindrical instrument case.	298	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	Complete with cover, sets of rings for decor.

No.	*Item*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
4	Cylindrical instrument case.	299	Pompeii.	Depository	As 298. Once held 2 probes and a tweezers – 182
5	Cylindrical instrument case.	300	Unknown	Exhibit	As 298 but without cover.
6	Cylindrical instrument or medicine case.	301	Pompeii IX 9, 3-5 Casa del Medico Nuovov (II).	Exhibit	More compact version of 298 but without ring decoration.
7	Cylindrical instrument or medicine case.	302	Pompeii.	Exhibit	As 301.
8	Cylindrical instrument case.	303	Unknown	Exhibit	As 298 but without decorative rings; no cover.
9	Cylindrical instrument case.	304	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Exhibit	As 298; no cover. Originally contained 81, 82, 118, 189, 219, & 220.
10	Cylindrical instrument case.	305	Unknown	Exhibit	As 298; no cover.
11	Cylindrical instrument case.	306	Pompeii	Exhibit	As 298; no cover. Once held 7 instruments including 172, 167, 128 & 212.
12	Cylindrical instrument or medicine case	307	Pompeii	Exhibit	As 301.

No.	*Item*	**Bliquez Cat. No.**	*Provenance*	**Location**	*Design*
13	Cylindrical instrument or medicine case	308	Pompeii IX 3, 5.24 House of Marcus Lucretius.	Exhibit	As 301; cover missing.
14	Cylindrical instrument or medicine case.	309	Pompeii	Exhibit	As 298; cover missing.
15	Cylindrical instrument case.	310	Pompeii	Exhibit	As 298.
16	Cylindrical medicine case.	311	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Depository.	As 301; complete with cover.
17	Cylindrical medicine case.	312	Unknown	Depository	As 298; cover missing.
18	Cylindrical medicine case.	313	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Depository	As 301; complete with cover.
19	Cylindrical medicine case.	314	Pompeii	Depository	As 298; complete with cover.
20	Cylindrical medicine case.	315	Pompeii IX 9, 3-5 Casa del Medico Nuovo (II).	Depository	As 301; complete with cover.
21	Cylindrical box.	A1	Pompeii II 4, 1-12 Villa di Giulia Felice.	Antiquarium	Long slender example with engraved girth rings. Contains A2-A6.
22	Cylindrical box.	A7	Pompeii I 10, 7 House of M. Velusius Iuvencus.	Antiquarium	Base section with engraved and embossed girth rings. Contains A8-A11.

Appendix II

Where no scale is given this is because the original had no scale. Those images with no marked scale are not to scale.

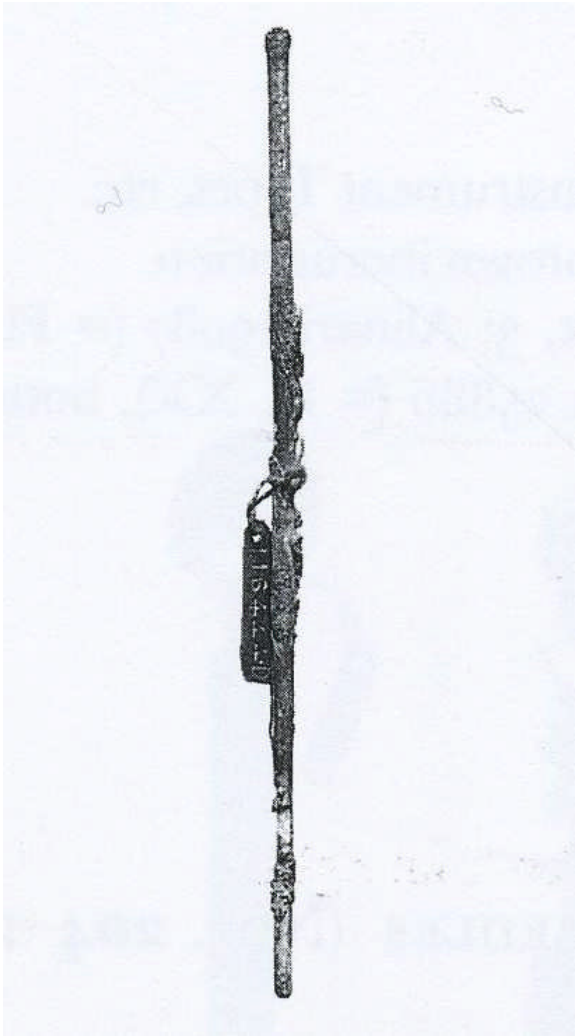

Fig. 1 No.206

Fig. 2 No.103

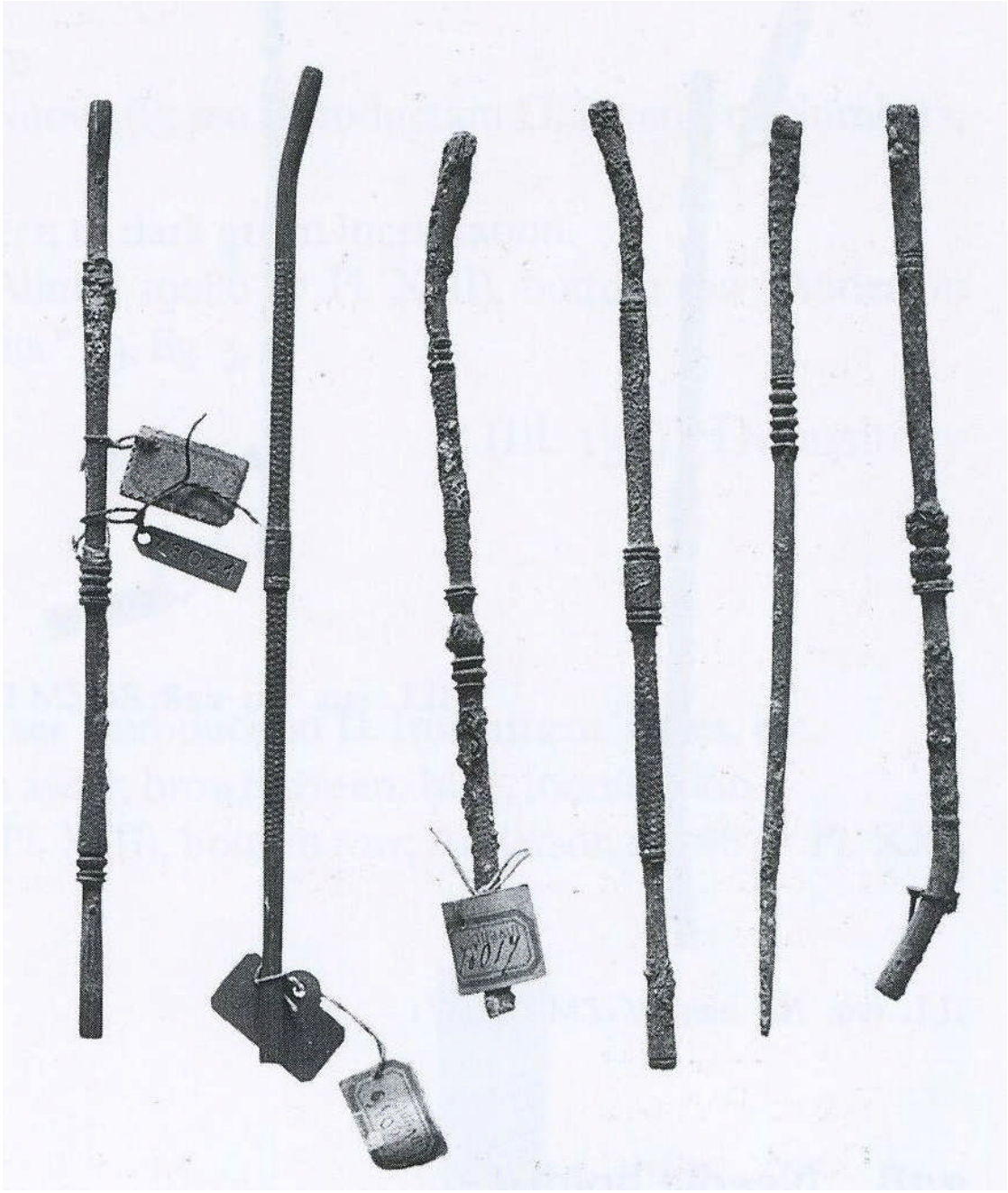

Fig. 3 No.221- 226 (l-r)

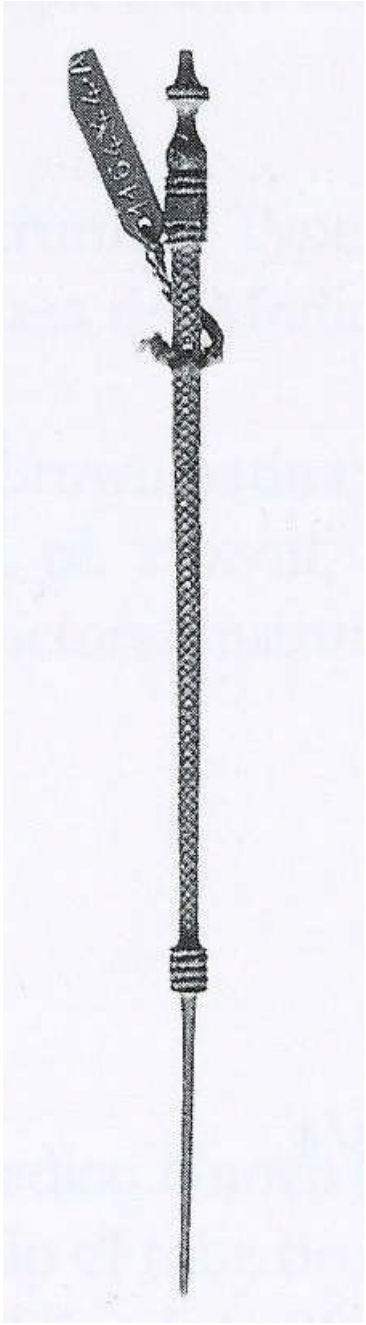

Fig. 4 No.220

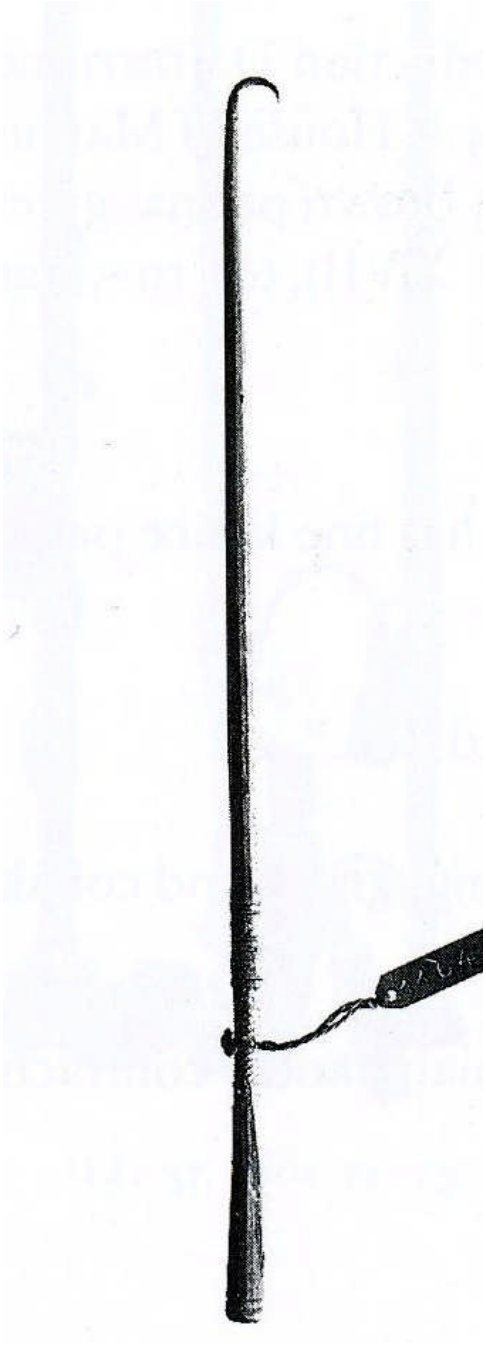

Fig. 5 No. 81

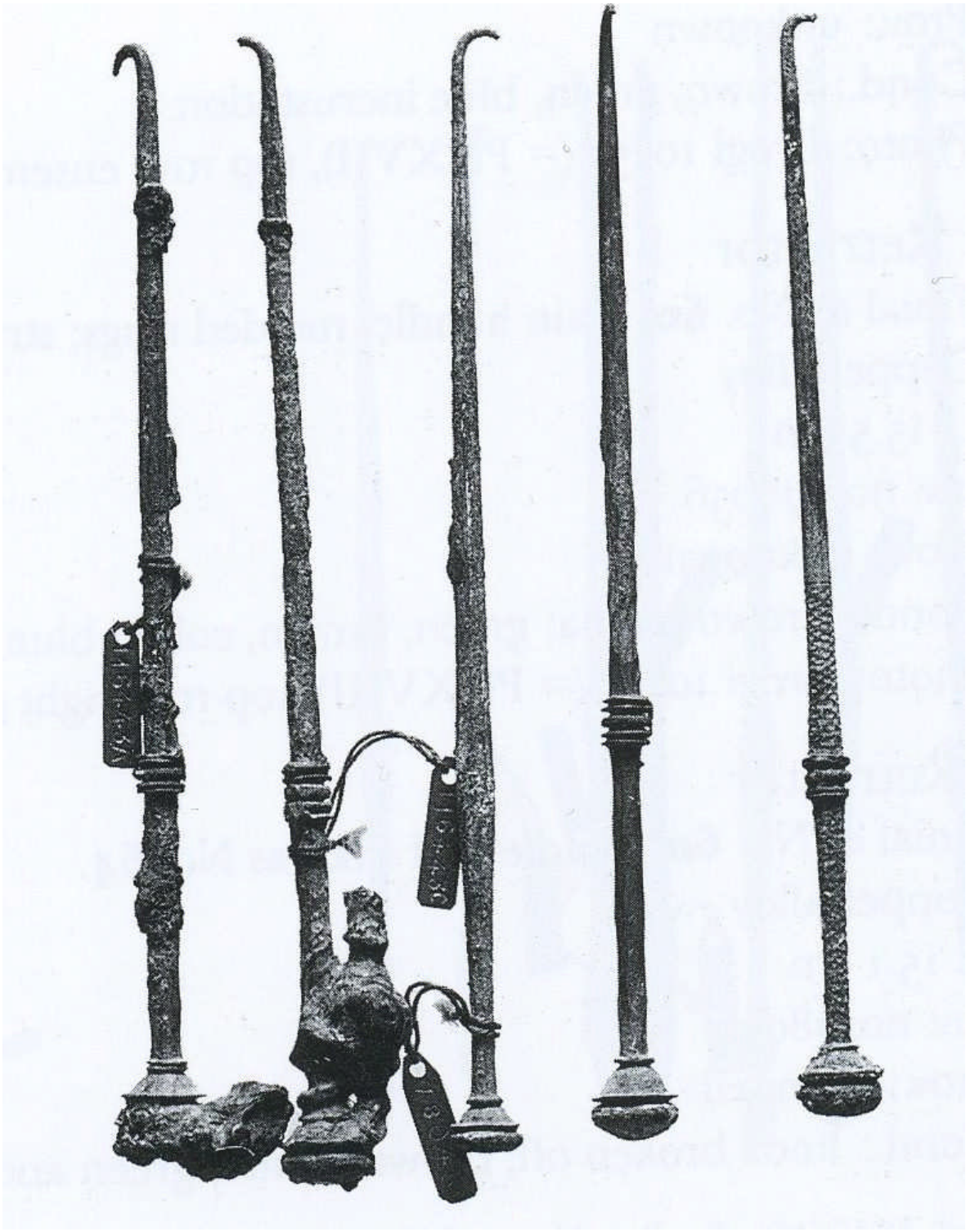

Fig. 6 No.71-75

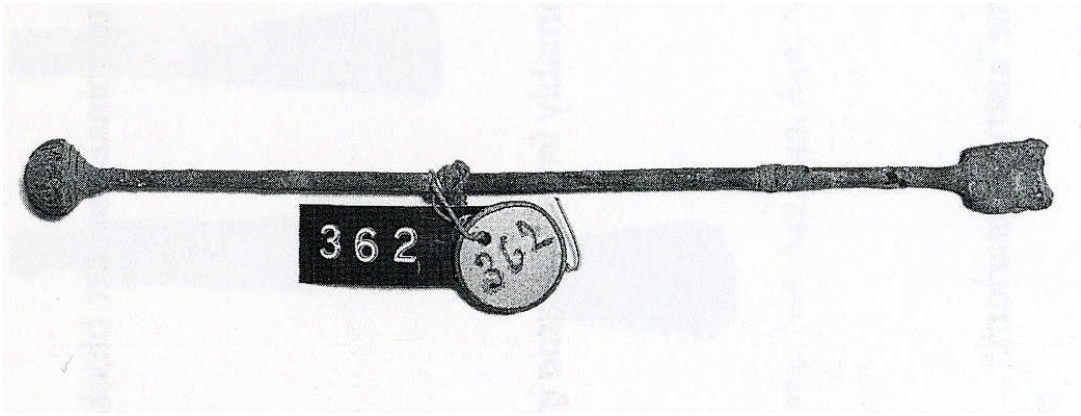

Fig. 7 No.A52

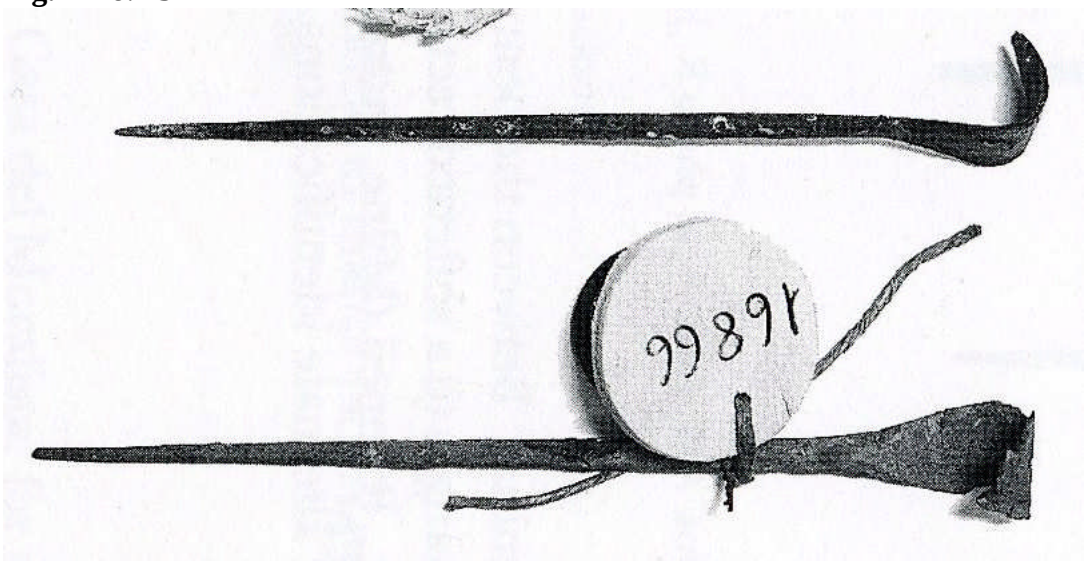

Fig. 8 No.A53 & A54

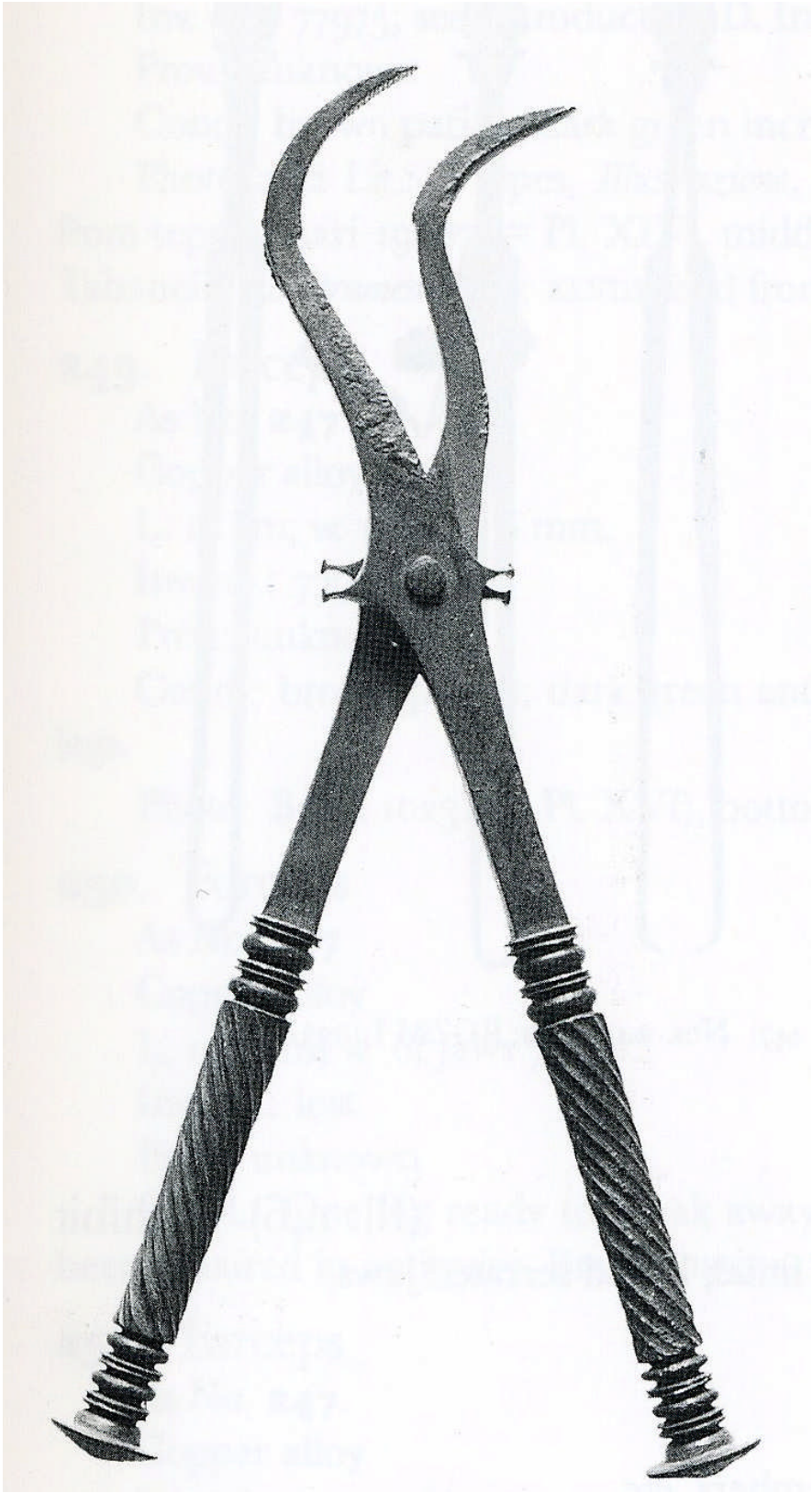

Fig. 9 No.242

Fig. 10 No. 244

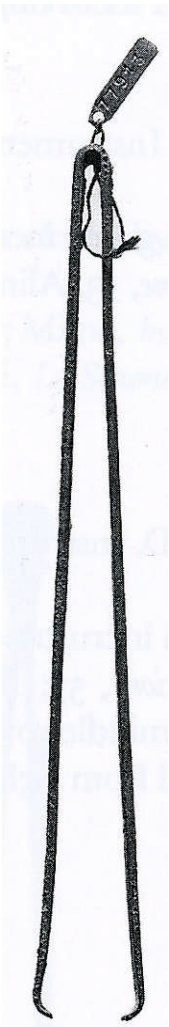

Fig. 11 No.253

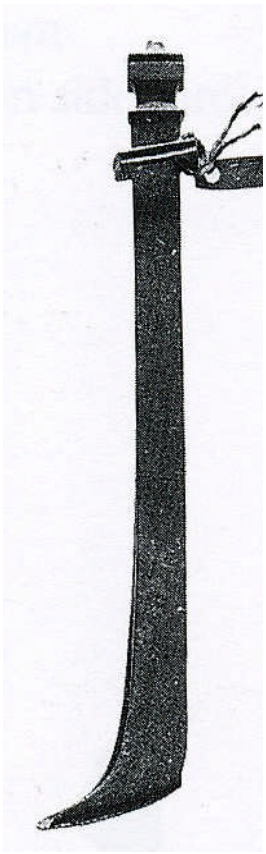

Fig. 12 No.245

Fig.13 No.14-18

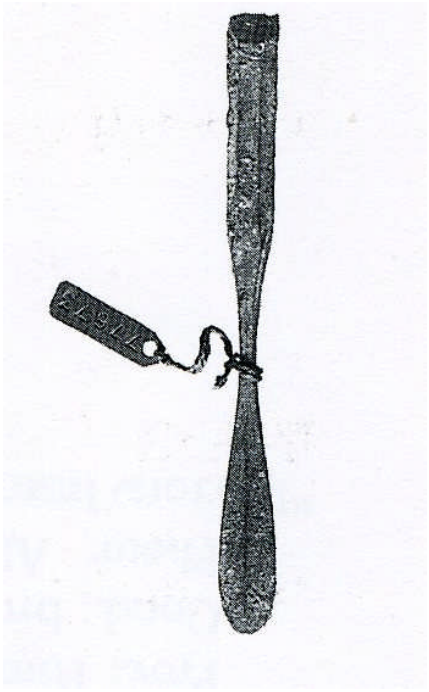

Fig.14 No.36

Fig.15 No.41

Fig. 16 No.91

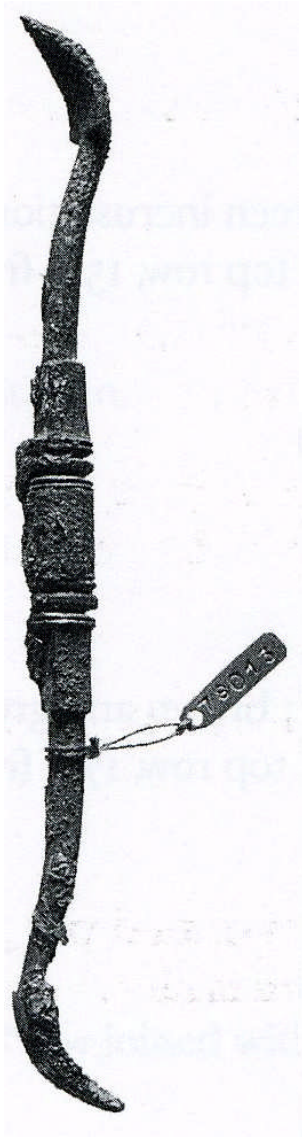

Fig. 17 No.92

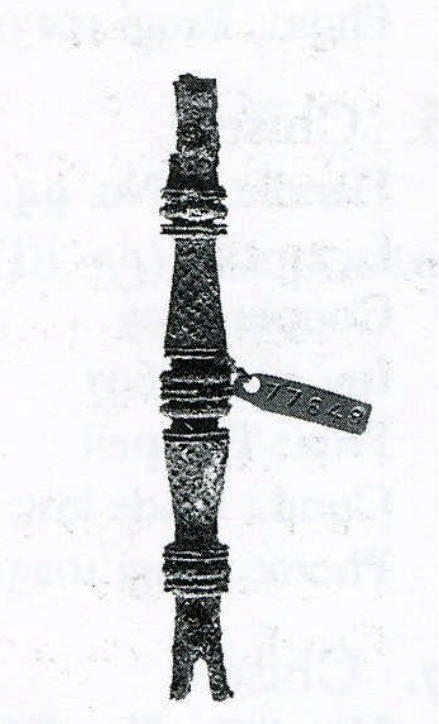

Fig. 18 No.93

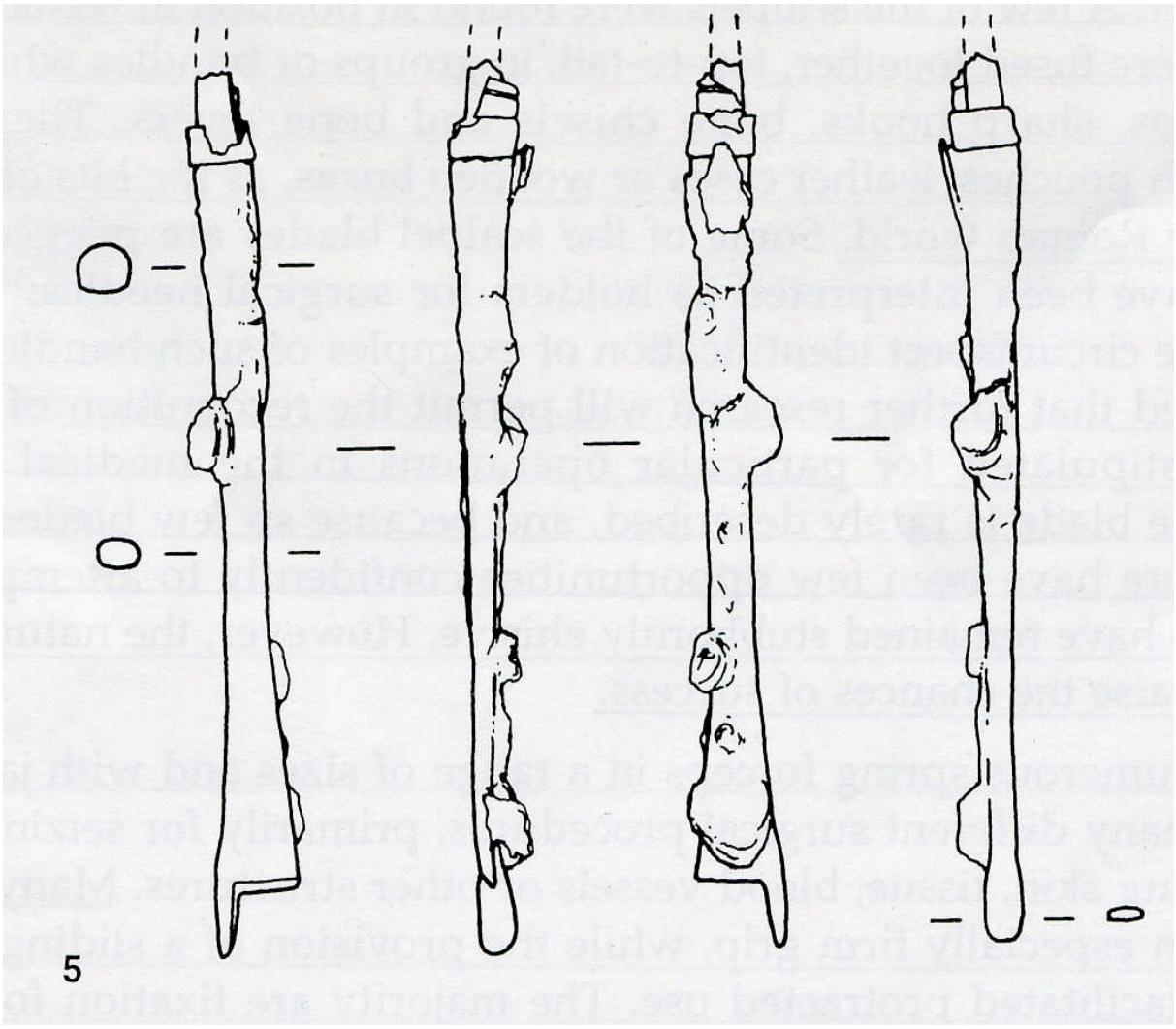

Fig.19 Four views of a lenticular (guarded chisel) from the Domus ‘del chirurgo’, Rimini. Drawing by R. Jackson

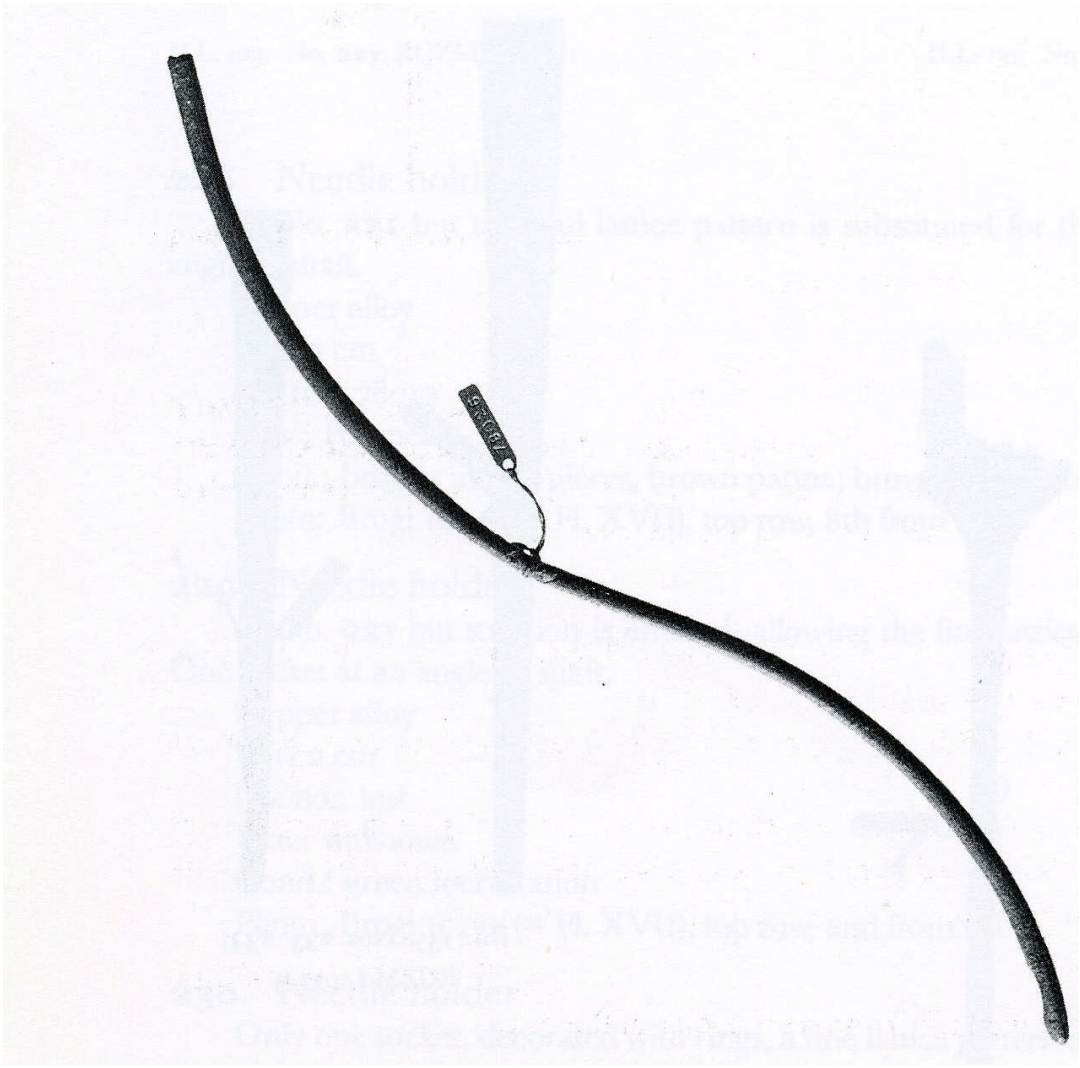

Fig.20 No.235

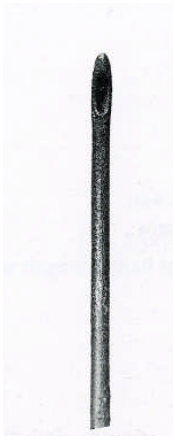

Fig.21 No. 235, detail

Fig.22 No.291

Fig.23 No.292

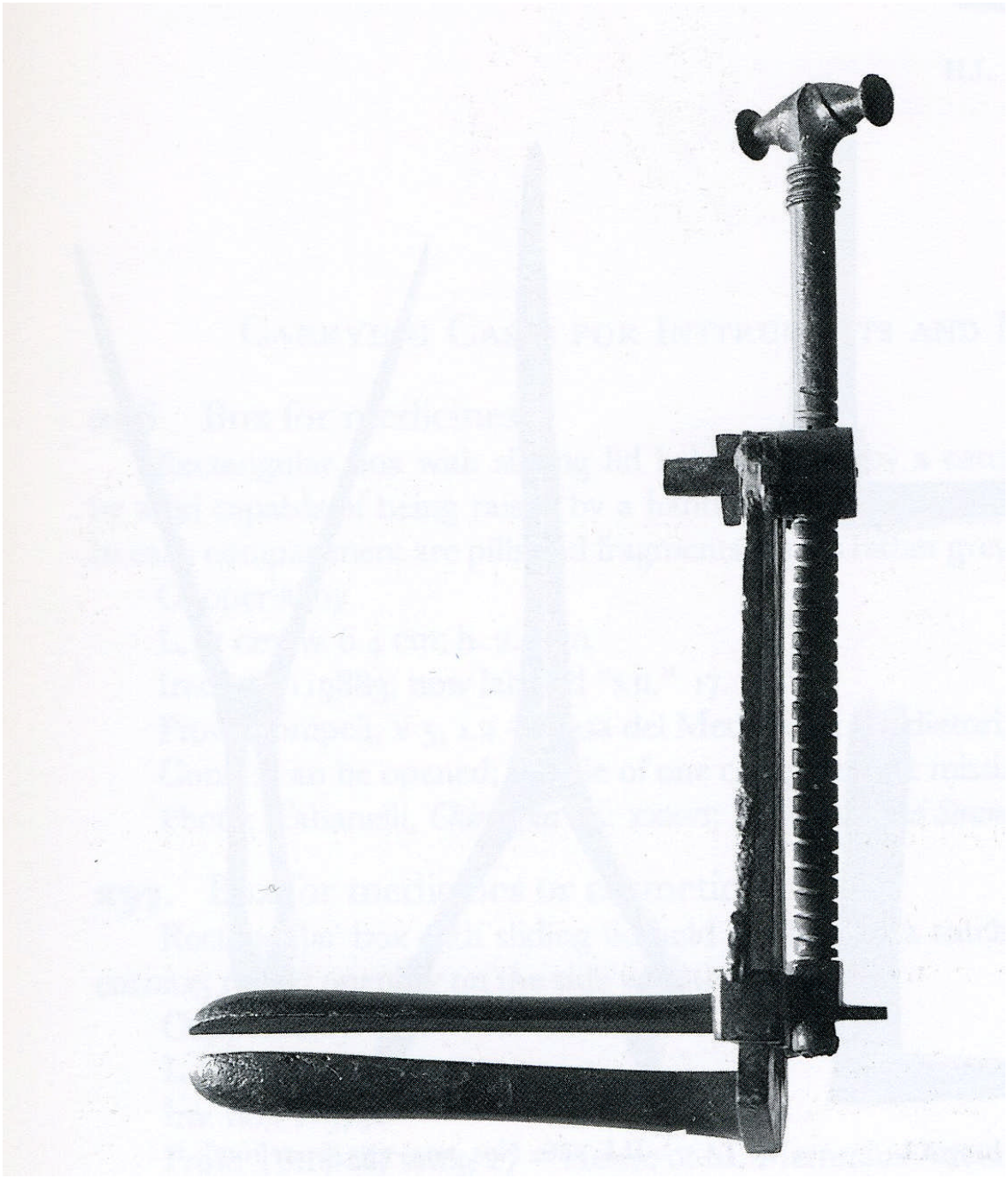

Fig.24 No.293

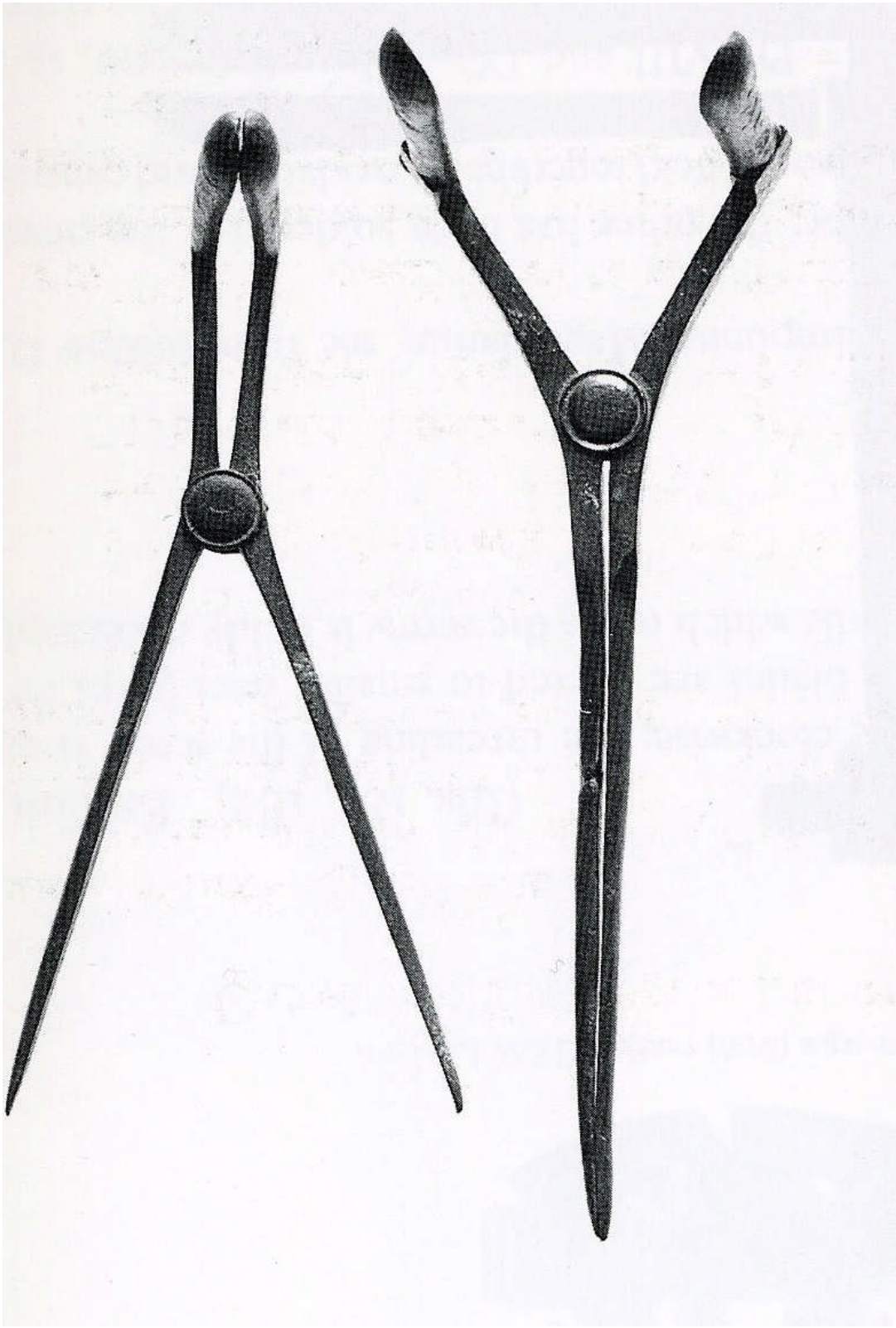

Fig.25 No.295 & 294

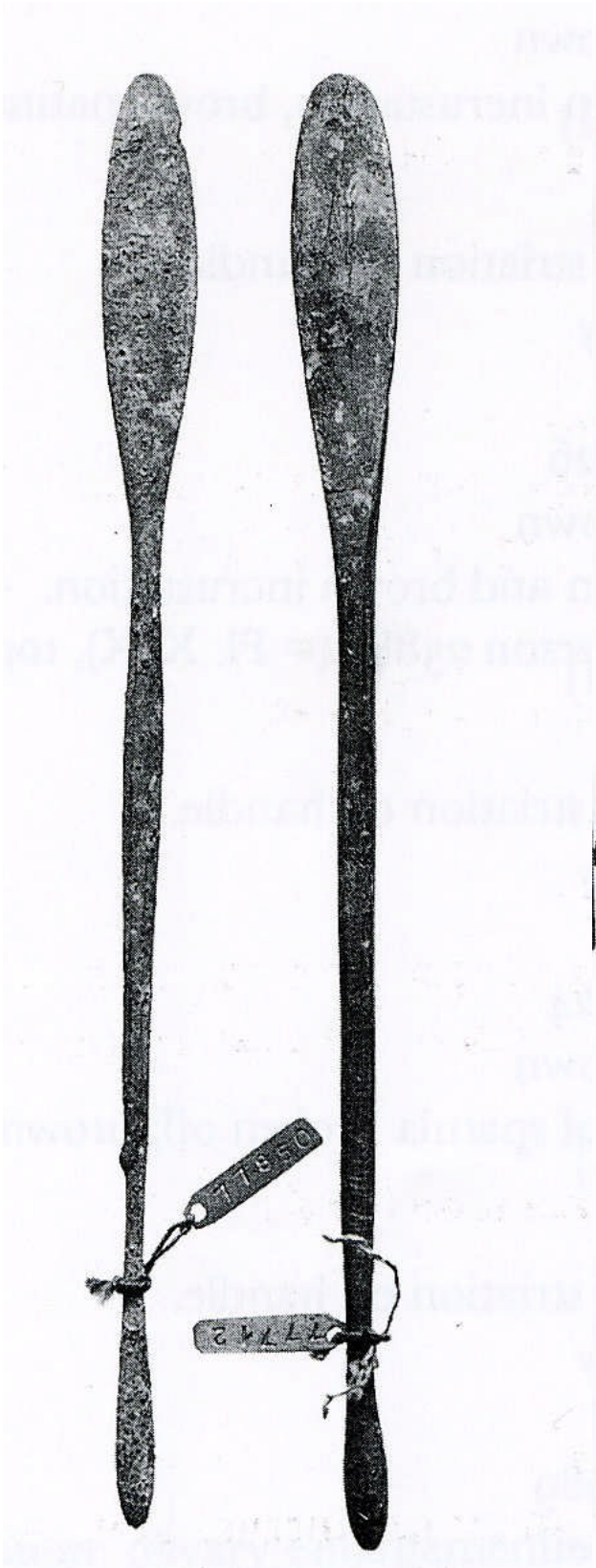

Fig.26 No.116 &117

Fig. 27 No.139

Fig.28 No.146-154

Fig. 29 No.A3

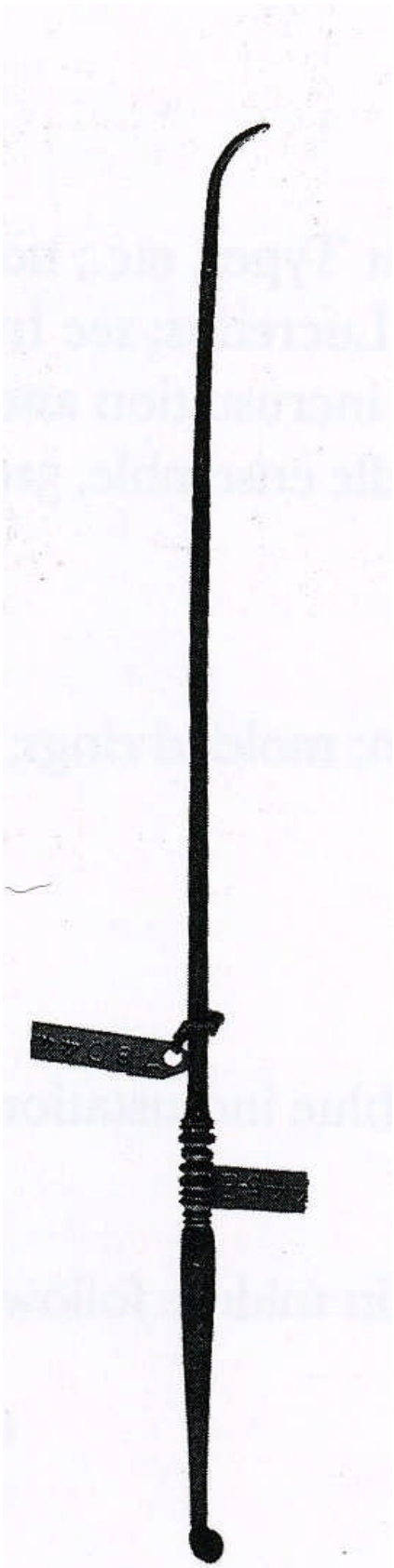

Fig.30 No.80

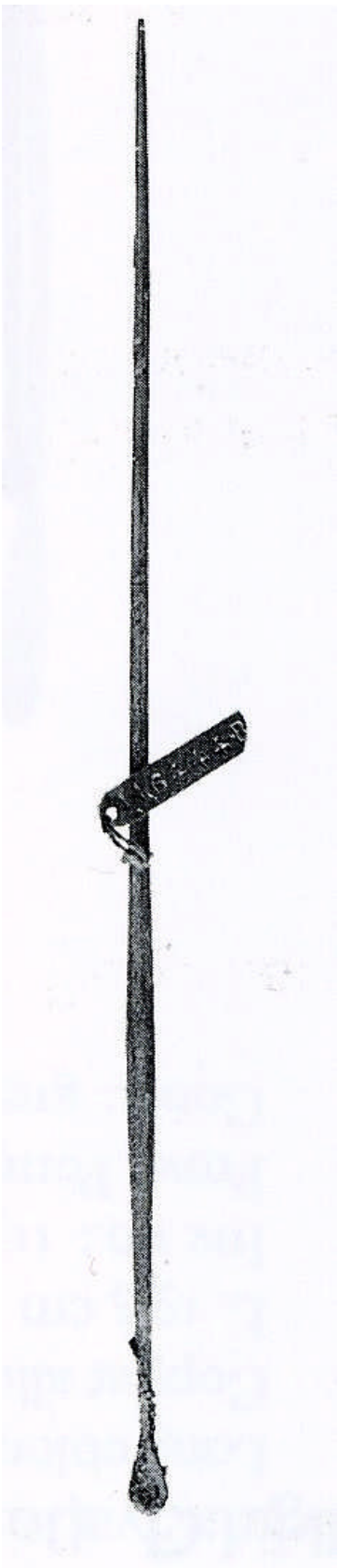

Fig.31 No.189

Fig.32 No.304

Fig.33 No.296

Fig.34 No.297

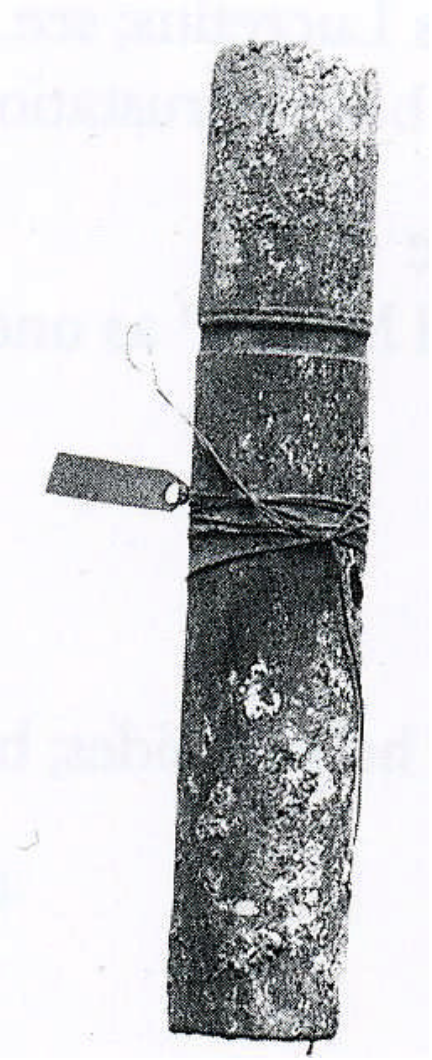

Fig. 35 No.311

Fig.36 Four scalpels from the Domus ‘del chirurgo’. Rimini

Fig.37 One of the fused clusters of instruments from the Domus ‘del chirurgo’, Rimini. A *sequestrum* forceps, lithotomy scoop and a folding handle for a trepan are clearly visible.

Fig.38 Two iron dental forceps fused to a spoon from the Domus ‘del chirurgo’, Rimini.

Appendix III

In this appendix I present the material on scalpels, hooks and forceps from Appendices 4-10 in Baker 2004.

3.1 Scalpels

Baker No.	Fort/fortress	Provenance
A4.1,1	Neuss/Novaesium Legionary fortress, Germania Inferior	South section of camp.
A4.1,2	Neuss/Novaesium Legionary fortress, Germania Inferior	Valetudinarium
A4.1,3	Neuss/Novaesium Legionary fortress, Germania Inferior	Not available
A4.1,4	Neuss/Novaesium Legionary fortress, Germania Inferior	Not available
A4.1,5	Neuss/Novaesium Legionary fortress, Germania Inferior	Valetudinarium
A4.1,6	Neuss/Novaesium Legionary fortress, Germania Inferior	Valetudinarium
A4.2,1	Nijmegen, Noviomagus, Legionary Fortress, Germania Inferior	Hunnerberg Grave 4
A4.2,2	Nijmegen, Noviomagus, Legionary Fortress, Germania Inferior	Hunnerberg Sarcophagus 1
A4.2,3	Nijmegen, Noviomagus, Legionary Fortress, Germania Inferior	Hunnerberg Sarcophagus 1
A4.2,4	Nijmegen, Noviomagus, Legionary Fortress, Germania Inferior	Nijmegen Sarcophagus Grave 1.
A4.2,5	Nijmegen, Noviomagus, Legionary Fortress, Germania Inferior	Nijmegen Sarcophagus Grave 1
A4.3,1	Bonn, Bonna, Legionary Fortress, Germania Inferior	Fabrica Bonner Berg outside fortress
A4.4,2	Vechten, Auxiliary Fort, Germania Inferior	Not available
A4.9,3	Xanten , Civilian Settlement, Germania Inferior	Room in the Bath
A4.9,4	Xanten, Civilian Settlement, Germania Inferior	Room in the Bath
A4.9,5	Xanten, Civilian Settlement, Germania Inferior	Room in the Bath
A5.1,1	Mainz, Mogontiacum, Legionary Fortress, Germania Superior	Not available
A5.1,2	Mainz, Mogontiacum, Legionary Fortress, Germania Superior	Not available
A5.2,4	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Breite Fig 26, Nr.5
A5.2,5	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Breite Fig 26, Nr.8

Baker No.	Fort/fortress	Provenance
A5.2,6	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Breite Fig 26 Nr.8
A5.2,7	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Meier excavation. Not available
A5.2,8	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Breite, Fig 26 Nr.6
A5.2,9	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Not available
A5.2,10	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Breite, Fig 26 Nr.4
A5.3,1	Ladenburg, Lopodunum, Auxiliary Fort, Germania Superior	Bath
A5.3,2	Ladenburg, Lopodunum, Auxiliary Fort, Germania Superior	Grave
A5.5,1	Zugmantel, Auxiliary Fort, Germania Superior	Not available
A5.5,2	Zugmantel, Auxiliary Fort, Germania Superior	Not available
A5.5,3	Zugmantel, Auxiliary Fort, Germania Superior	Not available
A5.8,1	Saalburg, Auxiliary Fort, Germania Superior	Not available
A5.14,1	Hofheim, Auxiliary Fort, Germania Superior	Old baths
A5.19,1	Degenfeld, Auxiliary Fort, Germania Superior	Not available
A5.25,4	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,5	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,6	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,7	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,8	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25, 9	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,10	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,11	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,12	Bingen, Auxiliary Fort, Germania Superior	Not available

Baker No.	Fort/fortress	Provenance
A5.26,1	Worms, Borbetomagus, Auxiliary Fort, Germania Superior	Grave field Maria Münster, in a child's grave
A5.26,2	Worms, Borbetomagus, Auxiliary Fort, Germania Superior	Not available
A6.1,1	Regensburg, Castra Regina, Legionary Fortress (Including the Auxiliary Fort), Raetia	Not available
A6.15,1	Risstissen, Auxiliary Fort, Raetia	Not available
A7.1,1	Enns-Lorch, Lauriacum, Legionary Fortress, Noricum	Not available
A8.1,1	Bad-Deutsch Altenburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Canabae
A8.1,2	Bad-Deutsch Altenburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Canabae
A8.1,3	Bad-Deutsch Altenburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Carnuntum
A8.1,4	Bad-Deutsch Altenburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Carnuntum
A8.1,5	Bad-Deutsch Altenburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Civil settlement
A8.1,6	Bad-Deutsch Altenburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Carnuntum
A8.2, 1	Vienna, Vindobona, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Neuer Markt 1943
A9.1,3	Budapest, Aquincum, Legionary Fortress, Pannonia Inferior	Aquincum
A9.2,1	Dunaújváros, Intercisa, Auxiliary Fort, Pannonia Inferior	Not available
A9.2,2	Dunaújváros, Intercisa, Auxiliary Fort, Pannonia Inferior	Not available
A10.2,1	Caerleon, Isca Silurum, Legionary Fortress, Britain	Isca Grange 3, Rubbish pits.
A10.4,1	Corbridge, Corstopitum, Auxiliary Fort, Britain	Forum Site

Baker No.	Fort/fortress	Provenance
A10.4,2	Corbridge, Corstopitum, Auxiliary Fort, Britain	Not available
A10.4,3	Corbridge, Corstopitum, Auxiliary Fort, Britain	Not available
A10.11,2	Carlisle, Auxiliary Fort, Britain	Annetwell St. Excavations

3.2 Hooks

Baker No.	Type	Fort/Fortress	Provenance
A4.2,6	Sharp	Nijmegen, Noviomagus, Legionary Fortress, Germania Inferior	Nijmegen Sarcophagus 1
A4.2,7	Bifurcated	Nijmegen, Noviomagus, Legionary Fortress, Germania Inferior	Nijmegen Sarcophagus Grave1
A5.1,4	Bifurcated	Mainz, Mogontiacum, Legionary Fortress, Germania Superior	Not available
A5.1,5	Foetal	Mainz, Mogontiacum, Legionary Fortress, Germania Superior	Not available
A5.3,4	Sharp	Ladenburg, Lopodunum, Auxiliary Fort, Germania Superior	Grave
A5.3,5	Sharp	Ladenburg, Lopodunum, Auxiliary Fort, Germania Superior	Grave
A5.25,18	Sharp	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,19	Sharp	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,20	Sharp	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,21	Sharp	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.25,22	Sharp	Bingen, Auxiliary Fort, Germania Superior	Not available
A5.26,3	Bifurcated	Bingen, Auxiliary Fort, Germania Superior	Grave field Maria Münster
A5.26,4	Needle with Hook	Bingen, Auxiliary Fort, Germania Superior	Weinsheimer Zollhaus
A6.4,1	Sharp	Ellingen, Auxiliary Fort, Germania Superior	Not available
A6.15,2	Sharp	Risstisseng, Auxiliary Fort, Germania Superior	Not available

Baker No.	Type	Fort/Fortress	Provenance
A8.1,7	Sharp	Bad-Deutsch Alterburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Carnuntum
A8.1,8	Sharp	Bad-Deutsch Alterburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	North Section of the Retentura
A8.1,9	Sharp	Bad-Deutsch Alterburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Valetudinarium West of the Quaestorium
A8.1,10	Sharp	Bad-Deutsch Alterburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Valetudinarium West of the Quaestorium
A8.1,11	Sharp	Bad-Deutsch Alterburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Area between the Via Secunda and via Quintana
A8.1,12	Hook with spatula	Bad-Deutsch Alterburg, Carnuntum, Legionary Fortress and Auxiliary Fort, Pannonia Superior	Carnuntum
A10.9,1	Sharp	Housesteads, Borcovicium, Auxiliary Fort, Britain	Trial Trench, south of Fort
A10.11,1	Sharp	Carlisle, Auxiliary Fort, Britain	Building One Period 4

3.3 Forceps

Baker No.	Fort/Fortress	Provenance	Extra details
A4.1,42	Neuss/Novaesium Legionary fortress, Germania Inferior	Building 46-52	
A4.1,43	Neuss/Novaesium Legionary fortress, Germania Inferior	Not available	
A4.1,44	Neuss/Novaesium Legionary fortress, Germania Inferior	Building 44	
A4.1,45	Neuss/Novaesium Legionary fortress,	Not available	

Baker No.	Fort/Fortress	Provenance	Extra details
	Germania Inferior		
A4.1,46	Neuss/Novaesium Legionary fortress, Germania Inferior	Not available	
A4.1,47	Neuss/Novaesium Legionary fortress, Germania Inferior	Not available	
A4.1,48	Neuss/Novaesium Legionary fortress, Germania Inferior	Not available	
A4.2,11	Nijmegen, Noviomagus, Legionary Fortress, Germania Inferior	Hunnerberg 1840	
A4.3,4	Bonn, Bonna, Legionary Fortress, Germania Superior	Stiftplatz	
A5.1,6	Mainz, Mogontiacum, Legionary Fortress, Germania Superior	Not available	
A5.1,34	Mainz, Mogontiacum, Legionary Fortress, Germania Superior	Not available	
A5.2,1	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Schutthügel	
A5.2,2	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Schutthugel	
A5.2.11	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Breite	
A5.2,12	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Schutthügel	
A5.2,13	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Breite	
A5.2,14	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Schutthügel	
A5.2,15	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Schutthügel	
A5.2,16	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Schutthügel	

Baker No.	Fort/Fortress	Provenance	Extra details
A5.2,17	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Not available	
A5.2,18	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Not available	
A5.2,19	Windisch, Vindonissa, Legionary Fortress, Germania Superior	Schutthügel	
A5.8,2	Saalburg, Auxiliary Fort,Germania Superior	Not available	
A5.9,2	Kapersburg, Auxiliary Fort, Germania Superior	Not available	
A5.12,2	Okarben, Auxiliary Fort, Germania Superior	Bath	
A5.16,1	Bad Wimpfen, Auxiliary Fort, Germania Superior	Not available	
A5.16,2	Bad Wimpfen, Auxiliary Fort, Germania Superior	Not available	
A5.20,2	Bad Canstatt, Auxiliary Fort, Germania Superior	Cemetery	With Olivary probe
A5.25,33	Bingen, Auxiliary Fort, Germania Superior	Not available	
A5.25,34	Bingen, Auxiliary Fort, Germania Superior	Not available	
A5.25,35	Bingen, Auxiliary Fort, Germania Superior	Not available	
A6.1,2	Regensburg, Castra Regina, Legionary Fortress (Including the Auxiliary Fort), Raetia	Auxiliary Cohort Fort Bath	
A6.15,3	Risstissen, Auxiliary Fort, Raetia	Parz 1076	
A8.1,19	Bad-Deutsch Altenburg, Carnuntum, Legionary Fotress and Auxiliary Fort, Pannonia Superior	Civil Settlement Insula VI 1952	
A8.1,20	Bad-Deutsch Altenburg, Carnuntum, Legionary Fotress and Auxiliary Fort, Pannonia Superior	Canuntum	
A8.1,21	Bad-Deutsch Altenburg, Carnuntum, Legionary Fotress and Auxiliary Fort, Pannonia Superior	Not available	

Baker No.	Fort/Fortress	Provenance	Extra details
A8.1,22	Bad-Deutsch Altenburg, Carnuntum, Legionary Fotress and Auxiliary Fort, Pannonia Superior	Civil Settlement 1989-90	
A9.1,8	Budapest, Aquincum, Legionary Fortress, Pannonia Inferior	Grave 216, Aranyheger Bach Necropolis	With ear probe
A9.1,9	Budapest, Aquincum, Legionary Fortress, Pannonia Inferior	Aquincum	
A10.2,5	Caerleon, Isca Silurum, Legionary Fortress, Britain	Fortress Baths	
A10.2,6	Caerleon, Isca Silurum, Legionary Fortress, Britain	Vicus, main lateral drain	
A10.2,7	Caerleon, Isca Silurum, Legionary Fortress, Britain	Castle baths, outside fortress	
A10.2,8	Caerleon, Isca Silurum, Legionary Fortress, Britain	Not available	
A10.3,2	Chester, Deva, Legionary Fortress	Amphitheatre East Entrance Antonine Deposit	
A10.3,3	Chester, Deva, Legionary Fortress	Extra Mural	

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