The Vigiles of Rome

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ABSTRACT

The Vigiles were a fire brigade, carrying out nightly patrols throughout the City of Rome. Originally 3,500 strong, they were increased to 7,000. The scale of their fire patrols makes them unique. Their equipment was basic but effective. The aqueducts made their operations possible by providing adequate supplies of water throughout the City.

Rome had a very bad fire problem, accentuated by the occurrence of several fires at once. Augustus applied the military technique of patrolling to the water resources already available. The conventional sizes of centuries and cohorts were appropriate for firefighting, and the Vigiles were organised as soldiers. But they were non-combative, and recruited largely from freedmen.

The continuous night duty was arduous, and around 8% of the men resigned each year. In contrast with soldiers, vigiles served for a normal period of only 6 years. There were a few openings for promotion to nco or technician, but further opportunities on the operational side were rare. Nco's and technicians could serve for many years. The officers (centurions and tribunes) had a military background. Centurions could serve for many years; tribunes did not. The prefect had judicial functions in addition to overall responsibility for the Vigiles, and was less concerned with active firefighting.

The two fields of ancient history and firefighting have been brought together. The evidence used to be under-utilised, but can be very informative. Probably the most neglected aspect was that of numbers. The two nominal rolls of the Fifth Cohort are key items, telling us the total numbers of men and also providing us with clues as to the length of service and the nature of the career. Within this framework, we can fit the evidence into a coherent picture.

With so many points at which the Vigiles were potentially effective, they must be ranked among the world's more effective fire brigades.

THE VIGILES OF ROME

by

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34. Original fire station, with two tabernae in north-west corner (shown hatched).

35. Later Hadrianic to Severan phase, with original tabernae incorporated in fire station, and with row of tabernae added along western end (shown hatched).

36. The Severan castra enlarged by incorporation of row of tabernae and further embellished.

37. Plan of remains of castra vigilum at Portus.
From Mon. Inediti 8 (1868), Tav.XLVIIII.

38. Plan of building described by Ligorio and identified by him as the castra of the Fifth Cohort, but more probably to be identified as the Macellum Magnum.
Rainbird and Sear (1971) fig.1.

39. Plan, according to Ligorio, of the Castra Peregrina, occupying area below the churches of S.Stephano Rotondo and S.Maria in Domnica (S.Maria della Navicella).
    Ms reproduced by Huelsen (1907) p.413. redrawn and relettered.
40. Plan of Casa di Diana.
    From Scavi di Ostia.
41. Plan of Casa delle Muse.
    ibid.
42. Plan of Casa del Serapide.
    ibid.
43. Plan of Casa degli Aurighi.
    ibid.
44. Plan of Horrea Epagathiana.
    ibid.
45. Plan of Piccolo Mercato.
    ibid.
46. Plan of building to east of castra vigilum at Ostia.
    ibid.
47. Plan of hellenistic gymnasium at Miletus (restored).
    Gerkan and Krischen (1928) Taf.III.
48. Plan of Pozzuoli macellum.
    Dubois (1907) fig.28.
49. Original plan, restored, of Housesteads principia.
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54. Mortality curves to illustrate a selection of 40 models which describe various levels of mortality.
    United Nations (1955) fig.9.

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CHAPTER 1

THE PROBLEM OF THE VIGILES

The problem of the Vigiles has been to discover what was missing from previous studies and then to try to supply it. It was clear at the outset that recent studies of certain historical aspects could supersede parts of the last study of the Vigiles, that of Baillie Reynolds (1926), but this did not seem enough as it left too many loose ends. What was needed was a more general unification of our knowledge of the Vigiles. Such a unification seemed likely to be found in the area of the function of the Vigiles. Then, reading through BR and other accounts, it became clear that this was indeed the missing factor: it had become a cliche that the Vigiles were a fire brigade, so much so that if any piece of evidence did not fit in with firefighting then it was related to the somewhat vague 'police functions' attributed to the corps without it being felt that this detracted from their firefighting function. An experiment was therefore tried, and with this the present study of the Vigiles took its major step forward.

The basis of the experiment was the small body of direct evidence that the Vigiles had firefighting functions, and the experiment actually took the form of seeing how much of all the evidence for the Vigiles, both direct and indirect, was consistent with it having been their major - and possibly even their sole - function to act as a fire brigade. It became clear that this was

the only hypothesis which made sense of all the evidence. As the study progressed, therefore, new lines of investigation were opened up, all of them directed to answering the question what sort of fire brigade the Vigiles were. It became necessary to import a knowledge of firefighting, and thus to see how far the evidence, slight though it was, could be shown to have reasonably definite implications concerning the mode of operation of the Vigiles. As a result of this approach, it is possible to suggest not merely how they did operate but also how much success they achieved.

Most of the evidence has been worked over twice during the preparation of this study. The first time round, the approach was a fairly traditional classical/archaeological one, the aim being to ascertain the various possible interpretations of the individual pieces of evidence but without a special knowledge of firefighting (or anything else, for that matter) which might have provoked a selective treatment of the material. It was after this first working over that the experiment just described was carried out, and it was thus a layman's impression that the Vigiles could only have been primarily a fire brigade. Initially, that seemed the end of the problem, and all that remained was to bring up to date various aspects of the Vigiles. However, even the very first, slight acquaintance with the history and techniques of firefighting suggested that this was really the starting point for a much more interesting enquiry. The point is that fire brigades can vary so much that we have to define what sort of brigade we are dealing with. There was, therefore, a pause from the historical researches while I set about acquiring an adequate understanding of the problems from

the fireman's point of view. The second examination of the evidence with the initial interpretations was therefore carried out with a better understanding of what is taken to be the Vigiles' main function. The results of this second examination are offered as the main contribution to knowledge of this thesis.

Embracing two fields which are usually mutually exclusive, classical history and firefighting, study of the Vigiles started off hopefully, only to degenerate when the two fields became more specialised. The first study of the Vigiles, by Origo (1818), in fact marks the end of an era. About that time, classics was starting to become specialised and to develop beyond the scope of the average gentleman's education, and Origo, who was the comandante of the Rome fire brigade of his day, was among the last firemen capable, if they wished, of reading the classicists and antiquarians on equal terms. After Origo, there were attempts by firemen to write histories of the Vigiles, but since these were entirely dependent on the classicists' presentation and basic interpretation of the evidence, they have not been successful. In addition, firefighting itself was starting to change, and to depart from methods which had the merit for the historian both of resembling the ancient methods and also of being capable of understanding by the layman.

One reason why Origo wrote successfully about the Vigiles is that the ancient sources told him what was familiar. Once manual pumps became very large, in the first half of the nineteenth century, and were then superseded by steam, then petrol and diesel pumps, and ladders became extending and motorised, pre-assumptions had to change: and ancient firefighting started to become foreign.

Origo took his sources at face value, and did not need to explain them. For this reason, his work has had less influence on classicists than it might have if he had spelled out the significance of the sources. Also, of course, he was only as up to date as the classics of his day, and the basic evidence had been quoted and requoted by antiquarians since the sixteenth century. Moreover, culturally he stood a little apart from the main stream of classical studies, for, although he read his paper to the Pontifical Academy, there was a political occasion for his interest: Origo was trying to persuade the Vatican authorities not to abolish the fire brigade which the French had established in Rome, and one of his tactics was to invoke classical authority for such an institution. He went even further, claiming that the ancient brigade was superior to the present one, and in fact he won his case and the brigade remained in existence. But the politics and the history are in fact kept reasonably separate in his paper, and the great pity is that he did not enter into details of how he thought the Vigiles would have operated. The value of his paper, in fact, has not been so much the discussion of the bits of evidence as the refreshing feeling which it brings for the student of the Vigiles - particularly after reading more recent works - to find a fireman writing about the Vigiles and some of their odder methods as if they were entirely familiar and just what was to be expected. It now takes a certain amount of historical imagination for a modern fireman to grasp precisely how the Vigiles operated: Origo was probably the last classically-minded fireman whose own experience and instincts were close to those of the Vigiles themselves.

The next two studies of the Vigiles came from classical historians, Kellermann and De Rossi (1835 and 1858 respectively). The discovery of the two large statue bases, VI.1057 and 1058, provided such an increase in information about the Vigiles that after Kellermann published the texts and a certain amount of comparative material (drawn from the usual antiquarian stock), together with lists of men who appeared on both stones, De Rossi felt that his own study of the fire stations in Rome was merely complementary and that little more remained to be said (at that time the excubitorium in Trastevere and the castra at Ostia had not been discovered). In fact, the contribution of 1057 and 1058 was exaggerated at that time: Kellermann's analysis of the men who recurred was taken as the end of the story, and the questions which he raised regarding the length of service implied by the inscriptions and the career prospects were left unanswered; and in incorporating more recent researches and observations from classical workers he left unasked the question which should have been foremost in his mind, what these inscriptions might ultimately tell us about firefighting in Rome. Possibly Kellermann had it in mind to study the lists further, but his untimely death intervened. Certainly, as far as he went, his work has been invaluable, and was incorporated in CIL largely unaltered, though with the addition of complementary lists of men who occurred in only one of the lists. It was his presentation of the lists in CIL which first stimulated a second examination of them, and what this thesis adds to Kellermann's analysis is a hypothesis to explain why the men survived in the lists, or not, in the way in which they did. This in turn provides the foundation for the further analysis of careers, prospects and way of life in the Vigiles. Without such an analysis, the Vigiles would have remained a rather amorphous body.

The next key work should have been that of De Magistris (1898), himself a fire officer in the Rome brigade (Sotto-Comandante in II dei Vigili di Roma). Unfortunately, he was not specially historically minded, and wrote enthusiastically about what he thought he understood and found familiar, and left on one side problems of evidence and interpretation. He did, however, touch at least on the major aspects of interest to a fireman, but perhaps his most glaring omission comes in his discussion of the water supply: he knew that this was a vital aspect, and laboriously indicated evidence for springs and wells in ancient Rome and also referred to the Tiber - but the aqueducts are not even mentioned, and even at that date there were sufficiently accurate estimates of the amount of water which they delivered to show that they were far more use for firefighting than the natural sources. By this time, though, classics and firefighting had gone their separate ways.

With Baillie Reynolds (1926) we come to the work which has become accepted as standard on the Vigiles. The great merit of this book is that it contains, either in quotation or by reference, all the important evidence concerning the Vigiles. Its demerit, as far as the user is concerned, is that it does not offer a consistent picture of the Vigiles. BR himself did not claim to offer one, and modestly expressed the hope that "the next person to attempt it" would find some value even in a collection of scattered materials (p.5). Certainly, this hope has been realised, and in addition BR's habit of presenting two or more interpretations without deciding on one or any other has been extremely useful (though doubtless it irritates the general reader and the quick looker-up). Possibly the most important criticism of BR's approach is that he did not go

sufficiently into the needs of firefighting and the range of methods and techniques developed even as far as 1926. It is true that he does occasionally refer to firefighting of the twenties and a little earlier, but the range of firefighting to which he does refer is not enough to provide guidelines for a study of the Vigiles. Even more in 1926 than in 1898, firefighting and classics had moved right apart.

This brings us to the heart of the problem. Either a classically-minded fireman had to write about the Vigiles, or else a fireman-minded classicist. For the latter, there are available in 1973 means of finding out about firefighting which did not exist in 1926, or even till after the Second World War. First and foremost, the Manual of Firemanship, the Home Office textbook for firemen, published in sections starting in 1942, sets out the principles and techniques for a wide range of firefighting situations, and illustrates the equipment, including some historical notes on older pieces of (modern) equipment. Second, Blackstone's History of the British Fire Service (1957) is invaluable on two counts: it presents a very wide range of types of firefighting, and it reveals attitudes and reactions which I have found to be quite common among firemen. In fact, Blackstone's book has been more valuable for its comparative material than for its section on the Vigiles (which Blackstone erroneously supposed to have existed in Britain, hence their inclusion). Another book by a fireman, Morris's Fire! (1939), provides useful information on methods of organisation to fit particular situations, this time in the London brigade, of which Morris was Chief Officer from 1933 to 1938, together with first-hand accounts of fires and other activities. These published accounts have naturally been supplemented by discussion with fire brigade officers, as indicated

in the Acknowledgements, because there are so many little points which may not in themselves seem worthy of publication but which actually give a much deeper insight into the practicalities of firefighting than the more formal statements of principles or even the accounts of unusual fires. Also of great value (both to the historian and to the modern fireman) are the works of James Braidwood (1830 and 1866), who re-established the first city fire brigade in Britain in Edinburgh in 1824 and then set up the first London brigade, the London Fire Engine Establishment, in 1832. He sets out principles and techniques, and also illustrates equipment used in Edinburgh, at a time when equipment had started to be improved but not so much as to make earlier firefighting into something foreign. For the majority of fires, even today, for which elaborate equipment is not required, Braidwood furnishes a good textbook.

The problem, then, was to bring together again the two fields of firefighting and history. Chapter 2 therefore sets out some of the general questions which arise in any consideration of firefighting, and in Part II (Chapters 3 to 8) we examine in detail the evidence relevant to this study of the Vigiles as a fire brigade. In trying to tie together the loose ends relating to firefighting, it has unfortunately been necessary to leave other ends loose, particularly as each of the Chapters 3 to 7 is concerned with a different branch of learning and it is not possible to go into equal detail in all of them. It is hoped, however, that this picture of the Vigiles is soundly-based, and that the overall consistency which has been attained may not need modification except in the details. It is also hoped that the more speculative passages will be of interest, and one reason for their inclusion is that, since people will continue in any

case to speculate about the Vigiles, it is felt better for the speculation to take place within an informed framework.

With a modern fire brigade, one of the most obvious questions which comes to mind is whether they would be welcome if your own house were on fire. It is hoped that this study of the Vigiles will show that in their case there are sound reasons for answering this same question in the affirmative.

CHAPTER 2

THE PROBLEM OF FIREFIGHTING

This chapter has been written to provide essential background information about fires and firefighting and to provide a general framework for this study of the Vigiles. Further, the main conclusion of this study is that the Vigiles were an effective fire brigade: the significance of this is only brought out when we realise that of all the fire brigades that have ever existed, only a minority have been really effective, and only a very small minority have been as good as could be got. In a limited sense, everyone understands fire. However, few people have actually seen a building burn, and fewer still have seen a fire in its early, and crucial, stages. There are, therefore, many romantic notions about fires, and their existence is demonstrated when people are, for the first time in their lives, confronted with a real fire. In their panic, they may do nothing except freeze to the spot, or they may do whatever comes first into their minds: and so, perhaps, help to spread the fire. The job of the fireman is twofold. He has to solve the technical problems of rescuing people and extinguishing the fire; and he has to solve the personal problems of giving confidence to the panic-stricken and comforting those in distress.

In the ideal situation, every building and its contents will be completely fireproof, and there will be no need for fire brigades. In practice, the term 'fire-proof' is meaningless, and even the term 'fire-resisting' has only a limited application. Fire brigades will

be with us for a very long time. The situation in which they start to function is the final stage in a series of events which, cumulatively, show that society - both individually and corporately - is responsible for fires, and that the demand which society makes of firemen is that they protect people from themselves. There is some truth in the saying that the three most common causes of fires are "men, women and children"; but specific responsibility also falls on the shoulders of manufacturers and builders, traders, maintenance people, legislators, and many others. In the case of a house, for example, the responsibility for a fire may be passed back along the line as far as the architect, clearing the householder and the building contractor, but should it stop there? Should not the local authority which approved the plans have considered the possibility of fire? Probably this was not within its legal competence: so are the legislators to blame? In the end, very often, the fire brigade is blamed for failing to prevent damage and for failing to offer advice beforehand: both of which may be unreasonable criticisms.

Although fire extinction and fire prevention are different jobs, the same factors restrict the effectiveness of both. The problem is not lack of knowledge about fires: the practical aspects have been known for at least twenty-three centuries in western Europe, the principles in use today, in 1973, being the same as those familiar to Aeneas Tacticus, in the fourth century B.C. Sometimes methods have worked despite wrong theories about how they worked, and even the 'special risks' with which we are becoming more familiar today (special chemical risks, for example) are involved in a very small proportion of fires. Speed and water remain the chief weapons

against fire, and it is usually easy for anyone to predict whether a building can be evacuated quickly - once they have considered the question.

The major restriction on all fire work is the almost universal feeling that "it will only happen to someone else", or, "it won't be very serious". The dangers of fire are realised only after disasters of some magnitude, for example, the Great Fire of London or the Second World War, with the blitz of London, Coventry, Birmingham, Liverpool and other major cities. It was only during this war that the value of fire brigades was fully appreciated. A second restriction arises from the acknowledgement of fire as a universal risk, which leads to it being ignored as commonplace and as something to be lived with. Without strong popular support, fire regulations cannot be made effective, money cannot be raised for extinction and prevention of fires, people cannot be persuaded to have buildings designed to behave well once a fire has broken out, architects cannot make fire-resistance a selling point for their designs if clients are unwilling or unable to pay extra. There are also political and economic factors, as shown in the following note which has been kindly provided by Mr. Mirfin: the 1947 Fire Services Act "made it a requirement of the County Councils and County Borough Councils who were nominated as Fire Authorities to form fire brigades and make provision for giving prevention advice. The cost of the brigades is borne out of the rates, collected by the various local authorities, and whilst it was left to their jurisdiction on what services the government subsidy should be used the efficiency of a brigade could be ensured. This, however, was endangered when the government decided to insist on what services

their subsidy was spent and to include the Fire Brigade in a "Block Grant": meaning that if a local authority wanted to improve other services the Fire Brigade could be denied efficiency." The main restrictions are thus financial and social; for very complex reasons, people generally do not plan for fires.

The history of firefighting in modern times varies from country to country, and in each case the course of its development is a strong reflection of the customs and constitution of the particular country. Switzerland, for example, manages by democratic means to achieve a very low rate of fire loss; in Germany, to have a fire is treated like a crime; and in the United States, the preservation of the autonomy of each state and city has led to a tremendous variety of brigades, including quite recently insurance brigades that have let "their" protected properties burn if the premiums have not been paid. In firefighting, such national characteristics are important.

Technical limitations have also played some part along with social limitations in restricting the effectiveness of firefighting and fire prevention. One obvious example of technical limitation is shown in pumps: only in the nineteenth century did they start to become adequately large, and for much of that century they were manually operated (some using over forty pumpers). With the application of the steam engine to fire pumps hopes were raised at first, to be dashed when for several decades fire officers did not consider the steam engines sufficiently reliable for use in firefighting. Today, the use of diesel and petrol engines with centrifugal pumps means that vast quantities of water can be pumped at high pressure:

500 g.p.m. at 100 lb./sq.in. is common, and 1,000 g.p.m. at 100 lb./sq.in. is not uncommon. Another limitation arose from the non-existence, initially, of hose, and, later, from the stiffness and weight of leather hose. To be effective, water must reach the seat of the fire, and often it is useless simply to throw water or direct a jet of water through a window. Moreover, if a hose is not available, the pump must stand near the burning building, and run the risk of catching fire or being buried when the building collapses. The development of hoses kept pace with the development of pumps, and today there are hoses capable of withstanding the high pressures involved and which are also light and flexible.

In general, brigades have not, until recently, used the best equipment available, and even today there are still a few doubts. If we include brigades from all places and all periods, and of all types - private, public, insurance, full-time, part-time, police, military, gentlemen's amateur, and so forth - the striking conclusion is that the majority could have been much better. The gallantry of the firemen is not, generally, in doubt, though some brigades have drawn a fine line between rescuing people and extinguishing fires (the latter being the subject of financial arrangements). The question has normally resolved itself into one of finance, so that, for example, a country town in Britain, having suffered a bad fire, might feel it could spend a few pounds on a small and second-hand fire pump, and so it would obtain one which a better brigade had discarded as being unfit for service. We are brought back to the social limitations, together with keen estimates of the economic advantages of having a fire brigade. Smaller towns could not have

afforded an effective brigade which would have paid for itself in preventing fire losses: hence the financial arguments. But there is no reason why even small towns should not have ensured that buildings were adequately constructed and properly spaced. One gets the impression that the risks from fire were not appreciated.

Until the late 1940's fire officers could not be held completely blameless for the lack of appreciation of the risks. They often varied among themselves in their approaches to fire extinction and ways of running their brigades, and "domestic" problems occupied much of their time. Some sense of rivalry between brigades is good for morale, but too often the derision of one brigade for another was justified, and the need for complete confidence in equipment made an excuse for avoiding innovations. This was unfortunate, because some of the developments made a real difference to firefighting - the larger pumps, in particular, and the development of extending ladders and of breathing equipment. Several decades could elapse between the invention of a piece of equipment, its patent, and its adoption by a brigade in a reliable form; and it is only recently, and particularly through the efforts of such bodies as the Institution of Fire Engineers and the representatives of the firemen, the Fire Brigades' Union, that there has been any extensive and constructive interplay between firemen and designers of equipment. Before that, manufacturers probably played a major part in improving equipment. Yet, despite the diversity of views, the basic principles have always been known: speed and water. Some of the best brigades stuck to the principles without much elaboration, and were welcomed far beyond their own

areas: one of the best examples of a parish brigade was that of Hackney, London. Some of the Continental brigades avoided problems of manpower and discipline by being military (i.e. the firemen were soldiers), and among brigades of this type the French sapeurs-pompiers were held in specially high regard. In some of the larger British towns up to the beginning of the Second World War there were police fire brigades, in which policemen received special training and provided a fire service as needed; this type of provision ensured that a degree of discipline and efficiency were available at all times, and many police brigades were held in high repute. But good brigades were the exception; the average standard was fairly low, and the worst brigades were dreadful. One of them consisted of an aged widow who had inherited a pump and who occasionally managed to arrive first at a fire if it was nearby in order to claim the reward for arriving first; whereupon she would withdraw, and leave the firefighting to working brigades. Yet this one-woman brigade was held to satisfy the legal requirements for a parish brigade (Act of 1707).

The only criterion which is useful in a comparative study of firefighting (and one which is slightly different from criteria used for other purposes by fire officers) is how near to the ideal effectiveness a brigade came. Important issues are obscured if we start by qualifying our assessment of particular brigades with such phrases as "good in view of the circumstances". Some of these issues have only an indirect bearing on firefighting, and should be isolated as far as possible. The need for this approach will gradually be made clear when we see how the Vigiles depended for their effectiveness on factors which were beyond their control, and we shall see how the

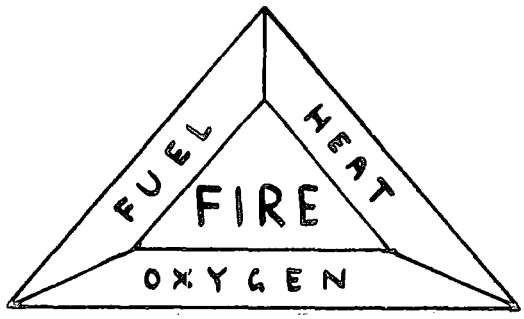
possession of a fire brigade is itself an indicator of a certain degree of urbanisation and, further, how the possession of an effective brigade is another indicator of a different degree or type of urbanisation. Questions of urbanisation and of the ability of the Romans to direct their resources where they wanted must come into any study of the Vigiles, though broader studies of urbanisation are not needed in this thesis. All the time, we have to consider both how the Vigiles functioned and also what factors enabled them to function as they did.

We have to remove the cliches. It has been fairly widely known for at least four centuries that the Vigiles possessed pumps, and this fact has been assumed to show that they were a good brigade. But mere possession of pumps has not guaranteed the quality of brigades, and a good case could be made against any constant relation between possession of equipment and quality of firefighting. Similarly, the fact that patrols were used has been generally recognised, yet the significance for firefighting has not been explained in detail. Patrols have been used by many brigades; the Vigiles must have had a unique type of patrol, since they had so many firemen available for patrols. We have to work out what effect the large number of men had on their firefighting in general, and set this against the quality of their equipment. Even more basically, we have to look at the sources to see precisely what they say: one major change in our understanding of the Vigiles comes when we pay attention to the fact, which is often overlooked, that the list of firefighting equipment given by Ulpian (Dig.33.7.1.18) is not a list of equipment used by the Vigiles (except coincidentally) but

is a list of items of property which belong with the fabric and fittings of a house and which cannot be sold except along with the house. Moreover, we have to express the conclusions precisely. At the lowest level, if people believe that the Roman fire pumps were small, not too much damage is done to truth when they write of "stirrup pumps" - except that Roman pumps were not fitted with stirrups. More important, we have to be informed about fires and understand how they behave. We have also to understand how one piece of information about firefighting will imply something further. The evidence for the Vigiles will tell us a lot more than it has hitherto, provided that we understand the language of firefighting. Fires, a universal threat, have changed little over the centuries: so now let us take a closer look at fires themselves.

A knowledge of the physics and chemistry of combustion is necessary for firemen, though a fire does not provide the best occasion for scientific experiments and the methods of tackling different types of fire are normally worked out beforehand; there are now standard methods for extinguishing many types of fire. Chapter 1 of the Manual (Part 1) describes the physics and chemistry of combustion (and extinction), and details will also be found in many elementary textbooks, normally in less complete and convenient form.

Combustion is a chemical reaction evolving heat and light. The three basic requirements are fuel (i.e. a combustible substance), heat and oxygen, often represented by the 'triangle of combustion':



Removal of one of these will stop the fire.

A flame usually accompanies the combustion of any substance (carbon is an exception) and most flammable solids and all flammable liquids emit flammable vapours. In general, oxygen is drawn from the atmosphere, though some substances (e.g. celluloid) contain sufficient oxygen to burn without air. Volatile combustible matter will travel until it reaches an adequate amount of oxygen, and in a conflagration this explains why the flames are long. (In turn, long flames help spread the fire more quickly and easily.) The large amount of volatile matter in wood, together with some of its chemical constituents, make it one of the worst substances from the fireman's point of view: "It is the general experience that if a timber structure once gets alight, the fire burns and spreads with great rapidity" (Manual 1, p.50). Methods of rendering timber non-flammable normally aim at preventing air from reaching the wood substances.

In addition to understanding combustion, firemen have to understand how heat can travel, and fire spread through a building. Metals, whether in the form of girders or doors, transfer heat by conduction, and other common building materials conduct to various lesser extents: a metal door will not be fire-resisting unless it is

also kept cool (e.g. by water spray). Convection currents carry hot gases upwards, and help a fire to spread rapidly upwards. In some cases it may be possible to vent the burning building to enable the hot gases to leave, but this technique always carries the risk of spreading the fire. Radiant heat can travel for considerable distances, and this is often the way in which a fire can jump across a street. A water spray, which absorbs heat, is often used to protect a building from radiant heat, and may also be used as a heat and smoke shield by a fireman entering a building.

Water is used for cooling because it absorbs a large amount of heat. Starting with 1 gram of ice at -10°C.,

5 calories are required to raise its temperature from -10 to 0°C.
80 calories are required to change the ice into water at 0°C.
100 calories are required to raise the temperature from 0° to 100°C.
540 calories are required to convert the water into steam at 100°C.
10 calories are required to raise the temperature of the steam from 100° to 120°C.

It is the conversion of water into steam that takes the greatest amount of heat from a fire. No other commonly available substance has such a great cooling effect, and this is why water remains unsurpassed for firefighting in the majority of situations.

An excellent account of the principles of fire extinction is to be found in the Manual, Part 1, Chapter 2 (pp.59-63). Rather than attempt to summarise it, I give the whole of this chapter as Appendix I, to be read at this stage, because much of the thesis which follows assumes some knowledge of the principles of firefighting.

A careful reading of Appendix I suggests certain implications for the methods to be used by a fire brigade. In the Manual, Part 1, the chapter which follows the one on extinguishing fire concerns "Methods used by the Fire Service", and discusses the implications with reference to the equipment available in the British Fire Service. The corresponding part of this thesis starts with Chapter 4. The remainder of this present chapter is intended to be more general, so that the needs will be clear without our running the risk of reading back modern methods into the Roman period.

The first requirement is clearly speed in attacking the outbreak while it is small. Convection currents can spread the fire very quickly, and in addition they can even prevent an extinguishing agent (e.g. a jet of water) from reaching the fire. Therefore any method of extinction will be most effective while the fire is only small. Moreover, a smaller amount of extinguishing agent will be needed for a small fire, and there will thus be less damage (e.g. from water).

Speed will depend on two factors: rapid detection of the fire while it is small and rapid arrival of firemen (including rapid access to the fire itself within a building). The old observation that most fires happen at night is still partly true, because at night people tend to be asleep or absent. Moreover, it often happens that the occupants of a burning building are the last people to learn of the fire. If fire patrols are used, they can be a very powerful weapon against the incipient fire, since the men who are looking for fires will also be able to start tackling them at once: in these respects they may

be likened to a human sprinkler system. Specialist equipment may be needed for gaining access to buildings, and firemen need sufficient knowledge of building construction to enable them to select the easiest points of entry.

There must be an adequate supply of water. It could be stored ready on the premises, it could be brought by the firemen, or it could be obtained from a nearby artificial or natural supply. The later a fire is detected, the more water will be needed, and for a really large fire several million gallons might be needed; many medium-sized fires require several thousand gallons of water. There should be means of getting the water onto the fire itself, and this may well demand the use of powerful jets. Pumps without hoses are at a serious disadvantage. If the water is taken from a public main, it is possible that the pressure in the system will drop, so that only a limited number of pumps can be fed from the system before the supply to each one will become inadequate.

In order to obtain access to the fire, the firemen must be able to move around in smoke and in atmospheres deprived of oxygen and laden with carbon monoxide (a rapidly-acting poison) and carbon dioxide. Smoke filters might be of some use, but where the atmosphere is doubtful self-contained breathing sets are a necessity. In some fires (e.g. those involving plastics) the toxic fumes necessitate the use of breathing apparatus. Firemen develop the ability to work in smoke and heat, far more than the average person could stand, but clearly there are limits to what will-power and training on their own can accomplish.

While they are in a burning building, firemen have to be able to tell when the building is likely to collapse and also have to be able to predict where the fire is likely to break through. They have to be able to recognise the moment when rapid withdrawal is called for, and be ready with a knowledge of possible escape routes. Their knowledge of building construction will tell them in what way and to what extent a building has been damaged by fire (this is a separate question from whether the building itself is on fire), and this will help them to anticipate collapses. They should be aware of the effects of their methods of extinction on the building and its contents (this applies particularly to possible damage from water).

In a small proportion of fires, there will be "special risks". These normally involve substances which have been invented or discovered only in modern times, and special methods have been devised to deal with them. For most of the history of firefighting, the special risks have been everyday substances stored in unusual quantities or in unusual ways - for example, bakers' furze (which was used in ovens) - or else they have been specially flammable buildings (normally, the more flimsy or badly-built, the worse a building is as a fire risk). For all of these everyday risks, water is the best extinguishant, so much so that rather than avoid the use of water in buildings installed with electricity special techniques are used to overcome the risks of electrocution.

Rescue of persons is the first aim of any fire brigade, and even brigades which made (or make) money from extinguishing fires were (or are) willing to rescue people free of charge. As with extinction,

rapidity is the key. Special equipment may be used to help the escape of injured or unconscious people. Very often, people in a burning building are suffocated in the first few minutes, and comparatively few people actually burn to death.

It is chiefly in the field of rescue that the fireman has to be able to cope with irrational and often obstructive people. Panic is the second enemy of the fireman, after fire itself, (some firemen would even rate it as the first enemy). The occupants of a burning building cannot be relied on to give any assistance or information, and they often have to be rescued in spite of themselves. The presence of a fireman can itself produce calm, and it might be possible to save lives simply by the fireman staying with a group of people waiting for a ladder to reach the window. As well as being calm, firemen have to look calm and reassuring, and their training and their ability to treat a terrifying situation as a technical problem are vital.

It will be apparent now that firemen need a wide range of abilities for their work. They have to be physically robust with large reserves of strength. They must be agile and able to perform all sorts of operations in precarious situations, and have confidence in themselves as well as their equipment. They have to have assimilated a large amount of technical information, about fires, buildings and their equipment. They need personalities that can withstand periods of waiting, and that can also produce vast amounts of energy at instant notice, and as long as they are on duty they have to be able to provide continuous gallantry. Above all, they have to be able to reduce panic.

The duties are very wearing, and the chances of injury are great. Men may decide to become firemen because, in part, they are attracted by the glamour and the opportunities to become heroes, but in order to survive at all they must channel their enthusiasms into professional skills. It is only when they have reached this stage, of being able to treat fire and the results of fire as technical problems, that they start to become useful firemen.

CHAPTER 3

ANALYSIS OF VI. 1057, 1058 and 1056

3.1.1.

Fire brigades consisting of several thousand men are familiar to us today. The Vigiles, too, consisted of several thousand men: but they covered an area much smaller than does a similar-sized modern brigade. This apparent discrepancy has led to exaggeration of the extent of the police duties of the Vigiles, for how could several thousand firemen ever have been fully employed in ancient Rome? It will be argued in due course that the sort of numbers which we find in the Vigiles are in fact consistent with certain methods of firefighting, and that by taking account of the number of men available we can deduce in considerable detail how the Vigiles will have set about their duties as firemen.

3.1.2.

The question of numbers is therefore crucial for this study. It can, moreover, be resolved by an analysis of the lists of Vigiles on the three statue bases, VI. 1056, 1057 and 1058, which is largely numerical and which needs very few historical assumptions. In the course of this analysis we shall touch on various aspects of the administration and organisation of the Vigiles, though only so far as this analysis demands. Once we have clarified the question of numbers we shall be in a proper position in subsequent chapters to interpret our historical evidence in detail.

3.1.3.

The material in section 3.2, which is reasonably self-evident and generally accepted, was first worked out by Kellermann (1835), though I was not aware of this until this whole chapter was completed. The new part of the analysis, starting at 3.3.1, was not anticipated by Kellermann. Partly for ease of understanding and partly because we can now refer to the published

texts of VI. 1057 and 1058 without having to reproduce them, I have left this chapter in its original form. I have reached a different conclusion from that of Kellermann on the total number of men originally listed on 1058.

3.2.1.

VI. 1057 and 1058 are two large statue bases discovered in 1820 in the *castra* of the Fifth Cohort. They were published by Kellermann (1835). Both bases are now in the *galleria lapidaria* of the Capitoline Museums. The archaeological discoveries made in 1820 are described in section 6.2.5.

3.2.2.

Each base has lists of *Vigiles*, arranged by centuries, on the sides and back. The front of 1058 is inscribed with a dedication to the *numen et maiestas* of Caracalla by the Fifth Cohort of *Vigiles*. The consular date is that of A.D. 210. The names of the prefect, sub-prefect, tribune, the centurions and the *cornicularii* of the prefect and sub-prefect are given below. The date of the dedication is given on the *corona*, 7 July, and also on the *corona* are the names of four doctors. The front of 1057 was never inscribed. However, since about a third of the names on 1057 recur on 1058, we can be sure that it was indeed set up by the Fifth Cohort as its findspot suggests. It is suggested below (3.5.2.) that we should accept that its date is A.D. 205.

3.2.3.

For the moment, it is enough to note that the names of the men who recur tend to occur, on 1057, towards the bottom of the lists of each century, whereas in 1058 they occupy higher positions. This is explicable if new names were added to the bottoms of the list, thus producing an apparent upward movement. 1057 is therefore earlier than 1058. This apparent upward movement was noticed by Kellermann (p. 9) and has never

been in doubt. On the other hand, the full implications have never been exploited. Given that during the interval covered by the two sets of the lists the names moved a certain amount, it should be possible to work out how much they moved each year (i.e. how many recruits and losses there were each year), and it should be possible to estimate the annual survival rate. Then, once these lists have been divided up into year-groups, it will be possible to see at once in which years of service the various posts (nco and technician) were held, and to establish the career patterns. All this is the subject of this chapter.

3.2.4.

In referring to these lists I have followed the usage of CIL, in which each century is numbered (from 1 to 7). The recurrence of some of the men enables us to see which century in 1057 corresponds to each century in 1058 (none of the extant names of the centurions in 1058 is that of a centurion on 1057), giving the following equations:-

1057		1058
1	=	1
2	=	2
3	=	3
4	=	7
5	=	6
6	=	4
7	=	5

Nothing on the original stones corresponds to these numbers.

3.2.5.

In order to distinguish between numbers (of men) and positions (of men within a list), I shall use square brackets to indicate locations as follows:

"C. Bellenius Saturninus [56]" tells us that Saturninus occupies the fifty-sixth position in his list. "[1-4] = 4" means that in the first to fourth positions there are four men.

The centuries will be indicated by their numbers as explained in 3.2.4. Thus 1057.3.[14] indicates the fourteenth man in the third century on 1057.

3.2.6.

Both 1057 and 1058 are somewhat chipped around the edges, and in places there is now plaster covering the lettering (left from the time when casts were made). The top of 1057 is undamaged, and no names are missing from this portion. 1058, however, is badly chipped around the top and names are missing from the tops of some of the columns. It is possible to estimate approximately how many names could have fitted into these positions (allowing extra space when the name of a centurion has to be supplied), and the results are as follows:

in latere intuentibus sinistro

col.1: centurion + 3 men
col.2: 5 men
col.3: centurion + 5 men
col.4: 4 men
col.5: 6 men

in latere intuentibus dextro

col.1: 13 men
col.2: 8 men
col.3: 8 men
col.4: 12 men
col.5: centurion + 8 men

in postica

col.1: 2 men

Kellermann's estimates are rather lower, so much so that I feel there is no doubt that they are wrong (briefly they are - following the same order as my own estimates - centurion + 0, 2, centurion + 3, 3, 4; 5, 5, 4, 6, centurion + 4; ?). 1058.7.[41] may confidently be restored [M.Fuficius Donatus]. The only names missing from 1057 are at the bottom of the list of the third

century, [100-121], where all that survive are the initial letters of 15 of the praenomina.

3.2.7.

By using these estimates of the number of missing names, we can establish how many men there were in each of the centuries of 1058. These totals are given below:-

century	1057	1058
1 = 1	160	178
2 = 2	167	149
3 = 3	121	158
4 = 7	115	155
5 = 6	143	85
6 = 4	118	152
7 = 5	93	150
total in cohort	917	1027

3.2.8.

I have checked the readings on the stones themselves with the published readings, and my conclusion is that in most cases there is no doubt whatever, and that where the lettering is now missing or obscure, the best available readings are those of CIL. In no case is the Corpus obviously wrong, and if we feel that some of the titles of the immunes and principales are unlikely, then the mistakes (if such they are) are probably those of the Romans and not of modern editors.

3.2.9.

In carrying out my analysis I have been aided invaluably by the reprint in CIL (pp. 208-219) of Kellermann's analysis of the men, by centuries, who recur: with the addition of complementary lists of men who do not recur. I have noted only one serious error in CIL: on p. 217 the last man listed under century 7 Iusti = 5 Romuli, L. Caecilius Modestus (Modetus), should be no. 28 in the century of Romulus, not 29 as printed

(Kellermann, with a different system of numbering, gives Modestus the correct number). On p. 219 the list of men who changed centuries needs to be used with caution, since the main lists in CIL's version of Kellermann's analysis are inconsistent in indicating whether these individuals have been transferred, and without this caution it would be all too easy to produce inconsistent and inaccurate figures.

3.2.10.

The lists give the abbreviated titles of the immunes and principales. In 1057 these titles are scattered throughout the lists, though with a concentration towards the top of each list, whereas in 1058 they are all at the tops of the lists (with the exception of the COD TR, at [54] in the first century: for most of the analysis which follows this title is ignored, since we do not know whether it was added afterwards or misplaced during the inscribing). Given that the men are arranged basically by length of service, we can see that in 1057 the immunes and principales are positioned according to their length of service, while in 1058 they have been placed together at the tops of the lists. There is considerable interest in the order in which the titles are themselves arranged in 1058. Initially we should note that if we can work out the year of service of a man in 1057 and if he recurs as an immunis or principalis in 1058, we can deduce his year of service in 1058 even though there the order of those titles is not according to length of service.

3.2.11.

There are variations in the manner of abbreviation of the titles of the immunes and principales, though the greatest variations occur between the centuries. Within the centuries there is greater consistency, the changes being by way of simplifications as one reads down the lists. This indicates that the list of the whole cohort (in each inscription, despite the different arrangement of the immunes and principales) was compiled by stringing together lists supplied by the centuries.

3.2.12.

1057 and 1058 provide the basis of this analysis, but it is also possible to use the analysis of these two inscriptions to analyse 1056 and so to obtain further material which can serve as a check on overall consistency. 1056 is a similar statue base to the other two, dedicated by the First Cohort in A.D. 205. The immunes and principales are distributed like those on 1057. Only four centuries are preserved, the back having been removed. For the discovery of this base see 6.2.1.

3.3.1.

We now pass on to the aspects of these lists which are less self-evident, and which lie beyond Kellermann's analysis.

This analysis will be unavoidably complicated, though the complications arise more from variations in the way in which men survived in the lists (e.g. transferred to different centuries) than from the method of analysis. In order to make clear what the method is, it will be helpful now to define our notation, and to illustrate the use of this notation.

3.3.2.

Let us represent the number of recruits in any year by 'n', and let us assume (just for this illustration) that n is the same every year. Let us call the annual survival rate 'r'. r cannot be greater than 1, and the more men die or leave the lower will be the value of r. Thus, if in one year n = 100, and during that year 5 men die, 6 men are dismissed, and 7 men resign, the total losses will be 5 + 6 + 7 = 18; hence 82 men will survive. Then, since n = 100 and nr = 82, r = 0.82. If there were no losses r would be 1, and if all the men died or left r would be 0.00.

Let 't' be the total number of men in the unit, and let 'y' be the total number of men who are serving beyond the required period. We can say that

$$t = n + nr + nr^2 + nr^3 + nr^4 + \ldots\ldots\ldots\ldots + nr^x + y$$

Let us assume in this example that the number of years for which the men are required to serve is 6 (the number of years for which it will be suggested the Vigiles signed on).

In general the sum 'S' of the series

$$a + ab + ab^2 + ab^3 + \ldots\ldots\ldots\ldots ab^m$$

in which b is less than 1 is given by the formula

$$S = \frac{a(1-b^{m+1})}{1-b}$$

In our case, then,

$$t = \frac{n(1-r^{5+1})}{1-r} + y$$

If we can find values for one or more of the unknowns, we can substitute in this formula to find the values of the others.

Our list may be visualised as made up of the groups as follows (the largest group, n, is at the bottom of the list, as it consists of the new batch of recruits):-

$$\begin{array}{rr} & y \\ & nr^5 \\ & nr^4 \\ & nr^3 \\ & nr^2 \\ & nr \\ & n \\ \text{total} = & \overline{t} \end{array}$$

3.3.3.

For our actual lists we must avoid begging any questions and distinguish the periods under consideration. Thus n_1 is the annual intake per century up to and including that of the year just before that of 1057; n_2 is the new intake on 1057; and n_3 is the annual intake after the year of 1057 (including the new intake of 1058). y_1 is the total number of men in their 7th or higher year of service in each century before the year of 1057; y_2 is the number of such men in the year of 1057; and y_3 is the (calculated) normal number of such men after the

year of 1057 (it will become clear why y_3 has to be calculated specially). t_1, t_2 and t_3 are the total numbers of men per century for each of the three periods in question (the normal value of t_3 has also to be calculated). On the other hand, we may assume that the value of r remains constant in all three periods, since the factors likely to have affected it (e.g. normal mortality, rigours of service) are unlikely to have changed perceptibly in the small interval of years which we shall be considering. r will also apply with the same value to the men in their 7th or higher year of service (y). (N.B. y is not the number of men who each year stay on: it is the total number of such men in the century, belonging possibly to a wide span of years of service.)

Because there are seven centuries in the cohort, there are seven values for each of n_1, n_2, n_3, y_1, y_2, y_3, t_1, t_2, t_3; the value of r will be based on the analysis of seven centuries.

3.4.1.

Our starting point is the group of men who appear in both sets of lists. If all the men who appear in the earlier lists had survived, the later lists would have contained all of them. They do not. Moreover, there are two observations which we can make at the outset concerning the men who do recur. First, in the earlier lists the majority of them occupy the lower part of each list, with the rest scattered higher up. Secondly, by noting which men have recurred in the later lists we can see the pattern according to which the other men have failed to survive. (In this chapter, we are concerned simply with survival in the lists; the nature of the actual survival - or operation of normal mortality, resignations, dismissals, etc. - is reserved for the historical chapters, and especially 5.2.10). The positions of the men who recur are shown in the tables at the end of this chapter, 3.12, columns A,C,E and G (these columns, and also B and F, simply set out the lists without any hypothesising; columns D and H contain conclusions; the tables which set out the analysis

of 1056 are at section 3.12.3.).

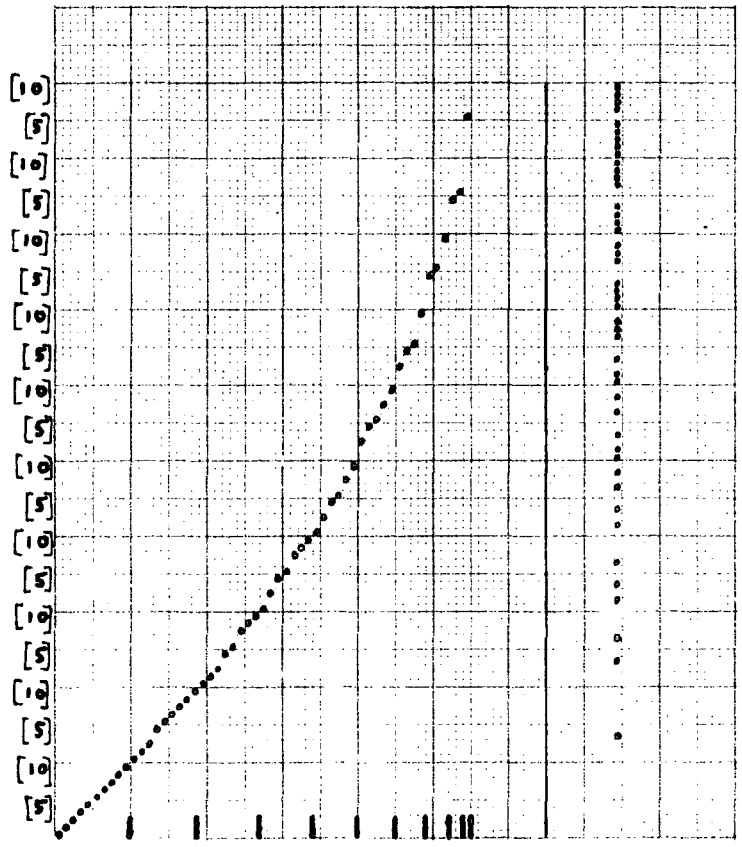
3.4.2.

It will be helpful first to consider a hypothetical list, to see how it would behave under extremely regular circumstances. Let us imagine that this hypothetical list contains 10 men. After a certain interval, let us say, 1 man drops out, leaving 9 men with 1 gap. After another, similar, interval, another 1 drops out, leaving 8 men with 2 gaps. This process repeats itself, until we have 1 man with 9 gaps. If we now think of the original 10 men as a batch of recruits, who survive for intervals of 1 year in the manner described, and if we imagine our list forming part of a much larger hypothetical list, made up from successive lists originally with 10 men in each, and if we imagine that each successive batch of recruits survives in exactly the same way, we can see the sort of pattern which will be apparent. The result will be the same whether we consider the same batch in successive years or a whole unit made up of batches of men with gradually increasing seniority. There will be a gradually increasing number of gaps. As long as no batches are omitted, the increase will be gradual and smooth. This is shown graphically in the diagram below, in which the men's positions in the original lists are plotted against their positions in the final lists. In this example, the men are assumed to drop out in the order [4,7,2,9,1,8,3,10,5]. (A different order would produce a slightly different pattern, which might be slightly more even or uneven.) The vertical axis shows the original positions, the horizontal axis shows the divisions between successive original lists as the men drop out. Reading along the horizontal axis, the positions originally held are as follows:

[1,2,3,4,5,6,7,8,9,10;
1,2,3,5,6,7,8,9,10;
1,2,3,5,6,8,9,10;
1,3,5,6,8,9,10;
1,3,5,6,8,10;

3,5,6,8,10;
3,5,6,10;
5,6,10;
5,6;
6]

There are 100 men in the original list, and 55 in the final one. On the right are shown the gaps produced by men disappearing from the lists, increasing in number as you read upwards from junior to senior positions.



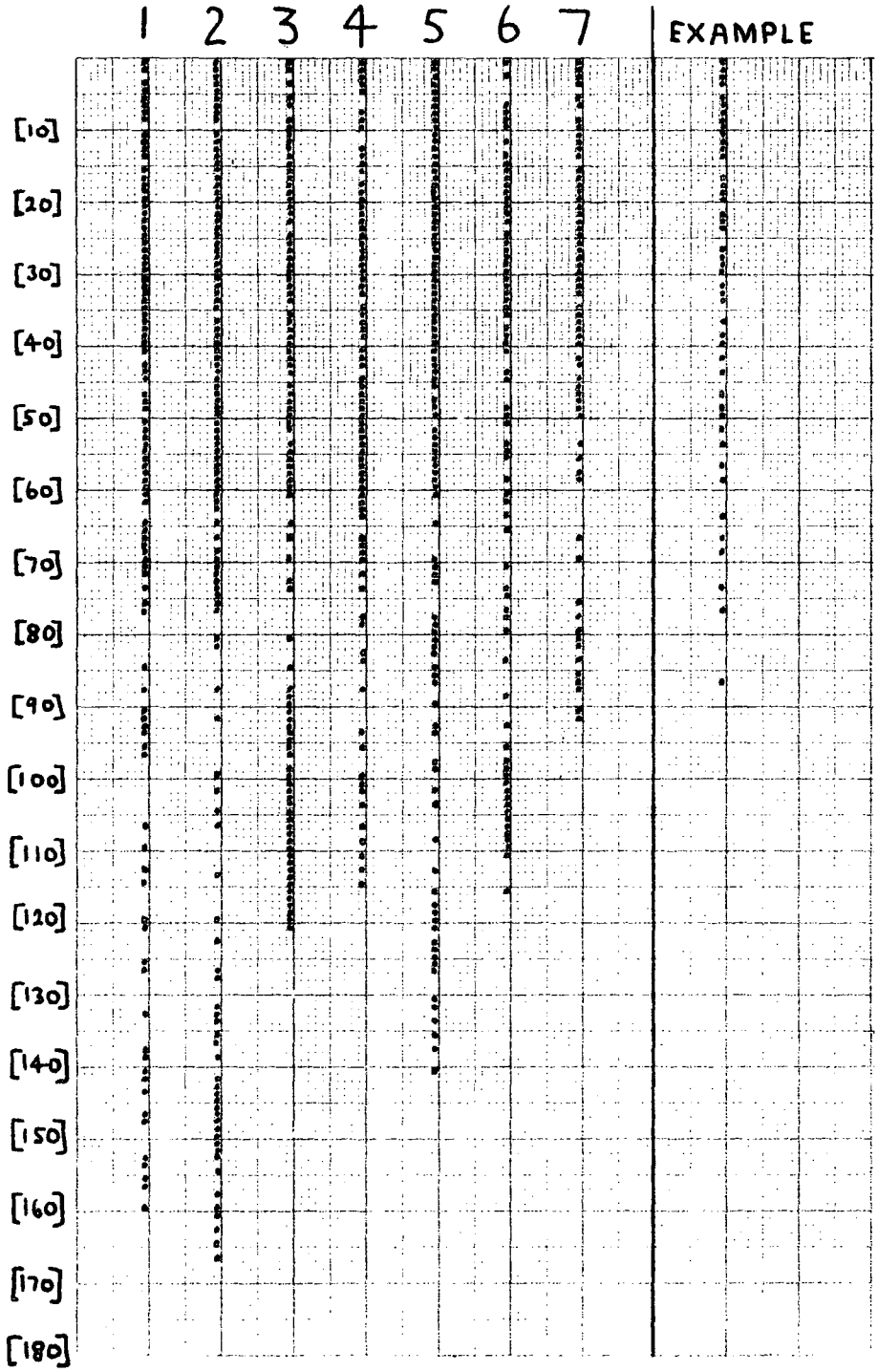
The factors which produce this pattern are the number of men in the original lists, the rate at which men drop out, and the number of lists making up the composite list (which is directly related to the interval at which new lists are made and the period covered by the composite list). The key feature is the change in the number and frequency of the gaps.

3.4.3.

Now for our actual lists. The manner of survival in the lists of the Fifth Cohort is not as simple as in the theoretical example, and it is necessary to take account of the irregularities (below, 3.7). It would be possible to describe the pattern of survival in the lists in a quite general way by using formulae such as have already been described (3.3.2.), but historically there would be little purpose in this. Preferably, the pattern should be tied down to actual years. Theoretically, of course, it is possible to analyse the lists by making any assumptions about the date of 1057 and the normal period of service, but it may help the reader to know now that it is possible to establish both of these points with accuracy, and so to complete the analysis within a "genuine" historical frame of reference. This means that in the subsequent part of the analysis, the one historical possibility is taken, and the logically-possible alternatives are ignored.

3.4.4.

We start by estimating how many original lists have gone to make up the composite ones. In the theoretical example, it can be seen that the frequency of the gaps is related to the number of lists (=number of years) represented in the composite list. Since the irregularities in the manner of survival would prevent a curved graph from being as informative as the theoretical curve (with men recurring out of the original order in the same century or recurring in different centuries), we will take simply the distribution of gaps which "appear" in the lists of 1057. In the tables at the end of this chapter (3.12.1), the appearance of a dash - in column C indicates that a man does not recur on 1058, i.e. a gap has appeared. The positions of these gaps are plotted in the diagrams below, and for convenience the diagram of gaps in the theoretical example is repeated, at the right.



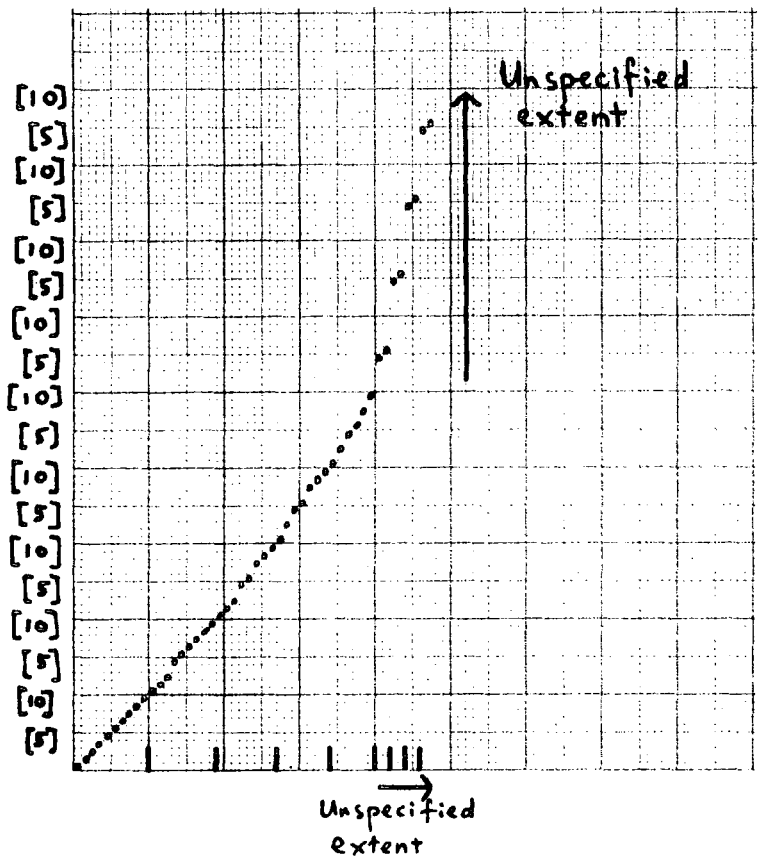
The striking feature of the distribution of these gaps is that they are not at all regular as in the example. In every case there is a fairly solid line of dots at the top of each list, with a scatter below. Century 3 is anomalous in having a block of gaps at the bottom, and this is explicable by the illegible state of the stone; it is suggested (at 3.7.6.) that there should be about 8 gaps in this position. For the moment, however, we should avoid a circular argument and leave this distribution as an

anomaly. Otherwise, centuries 1 and 4 show clearly just two groupings, a high frequency of gaps at the top and a low frequency at the bottom; centuries 2,5,6 and 7 have slightly more frequent gaps at the bottom than 1 and 4, but there is still a clear division into just two frequencies. We would expect to find more gaps at the tops of the lists than at the bottoms, since this is where men would tend to leave from; but what is odd is that in the lower parts of the lists there is no suggestion of an increase in the frequency of gaps as one reads up the lists. Even if we take into account the possibility of imprecision caused by the uneven distribution of men leaving within various year-groups, it becomes clear that we must reckon with the possibility that just one year-group is represented in the lower portions of the lists. At the tops of the lists, also, only century 6 shows more gaps in the higher part of the portion with the higher frequency of gaps, so that here again there is the possibility of just one year-group being represented. Do 1057 and 1058, then, cover just two years?

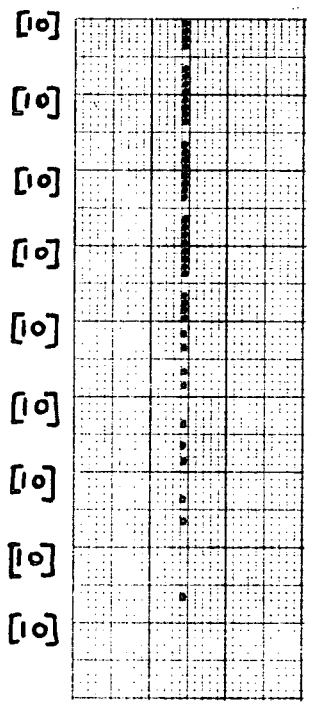
3.4.5.

This would be decidedly odd, and there are two other possibilities yet to consider. First, accepting that just two year-groups might be represented, it is possible logically that 1057 and 1058 are separated by several years; in this case, the great difference in the frequency of the gaps in the two parts of each list might imply that in all years but two there were no recruits: this is implausible, in all seven centuries. The other possibility is that the situation is a little more complex, and that at some fixed point many men left the service. This effect is shown in the diagram below, which uses the theoretical example again, but has many men leaving after 5 years. The positions originally held are taken to be the same as at 3.4.2. (see the list of positions which appear on the horizontal axis), but in this case numbers [1,8,3,10] are made to leave

after 5 years. The gaps develop as follows:



Set out as in the other diagrams, they look like this:



Broadly, now, the pattern is like that which appears in the actual lists, though there is still an increase in the frequency of the gaps in the lower part. In effect, we have to remove some of the groups from the lower part in order to obtain our actual pattern. This may be done quite simply by assuming that the composite list covers a number of years which is equal to the normal length of service. In this, the bottom part of the list would consist of one year's recruits, now in their final year

of service, with the gaps that developed over the period covered by the composite list, while the upper part would consist of men staying on beyond the normal period of service and representing an indeterminate number of years of service. This would be sufficient to produce the pattern which we observe in the actual lists.

3.4.6.

This conclusion enables us to state a relationship between the normal period of service of the Vigiles (i.e. the period after which most of them left) and the interval covered by 1057 and 1058 (1057, it will be remembered, does not carry its own date). 1057 (whatever its date) and 1058 (of A.D.210) themselves cover a period equal to the normal period of service in the Vigiles (counting the year in which 1058 was set up as a whole year). This means that if 1057 belongs to 201, for example, then they signed on for 10 years, if it belongs to 191 then they signed on for 20 years, and so forth. This much is inherent in the lists.

3.5.1.

For the historian, this is indeed a fortunate coincidence, provided that it can be utilised. The analysis of 1057 and 1058 at this point cannot carry us further forward, and our next step is to make use of an historically-based estimate of the normal length of service.

3.5.2.

For this, it is convenient to refer to the discussion of the length of service in Chapter 5 (5.2.5). The bases of the argument are, first, that analogous inscriptions to 1057 and 1058 belong to only A.D.205 or 210 and hence that 1057 (which is earlier than 1058) should belong to 205, and secondly that the period of 6 years which was demanded of Junian Latins before they were awarded the citizenship for serving in the Vigiles should have been the same as the normal period of service in the Vigiles. If 1057 belongs to 205, a period of 6 years is covered by the two inscriptions, and,

from the argument culminating at 3.4.6, 6 years should also be the normal period of service in the Vigiles. This is beautifully consistent with the argument based on the arrangements for Junian Latins.

3.5.3.

The part of the analysis which follows now is based upon the assumption that the normal period of service in the Vigiles was 6 years (and it should perhaps be emphasised that there is not a circular argument in utilising the proposed date of 1057 in order to establish this). The date of the dedication of 1058, 7th July, will have allowed the men who completed their 6 years of normal service on 1st March (see 5.2.8) to leave, so that the men in their 7th year on 1058 may be presumed to be staying on with positive intent.

3.6.1.

We must now define as precisely as possible the boundary between the two groups in each of our lists of survivors. Initially, in order to allow for the possibility that the lowest (down the list) of the larger numbers of gaps might include men who would have been in their sixth year, we may take off 1 from each of these lowest numbers and assign it to the group in their first year. The provisional grouping is therefore as follows:

Century	First (highest) man in group of recruits of 205
1=1	1057.1.[72]
2=2	1057.2.[82]
3=3	1057.3.[61]
4=7	1057.4.[64]
5=6	1057.5.[61]
6=4	1057.6.[36]
7=5	1057.7.[50]

3.6.2.

By this provisional grouping 1057.2.[80] should be in his second or higher year, and when after transfer, he reaches 1058.7.[21] he should be in his seventh or higher year. However, the man above him in 210, 1058.7.[20], has been transferred from 1057.3. [69] where he was clearly in his first year: in 210 he is therefore in his sixth year. This would imply that 1058.7[21] has become mixed up in the later group or that 1058.7.[20] has jumped ahead. Since the men retain their original order so consistently in general, it is better to avoid either of these implications by adjusting the boundary of the groups, and assigning 1057.2.[80] to the first-year group: in 210, at 1058.7.[21], he is therefore in his sixth year.

The man just below in 205, 1057.2.[81], does not reappear in 210,

so his effect on the adjustment is neutral. The man above, 1057.2.[79], is transferred and reappears in 210 at 1058.5.[16], where his position is ambiguous. 1058.5.[15] is certainly in his seventh or higher year of service, and 1058.5.[17] and [18] are to be assigned to their sixth year (see 3.7.5.). 1058.5.[16] could, from his position, therefore, belong to either group. So as not to depart too far from the provisional grouping, let us assign him to his seventh or higher year in 210. At 1057.2.[79] then, he will be in his second or higher year. The first man in the group of recruits of 205 will therefore be 1057.2.[80].

3.6.3.

1058.1.[16] started at 1057.1.[75] and should, by the provisional grouping, have been in his sixth year. But 1058.1.[17], starting at 1057.1.[63], and 1058.1.[15] starting at 1057.1.[64], are certainly in their seventh or higher years of service. Since these latter two have exchanged places, we cannot rule out the possibility of a wider confusion which also misplaced 1057.1.[16] and made him intrude into the group with longer service. The alternative is to adjust the boundary between the two groups, on the assumption that 1058.1.[16] is in the correct group and in 205 was therefore in his second or higher year of service. This is a more difficult choice than we faced with 1057.2.[80] = 1058.7.[21], since a greater number of men have to be re-assigned. However, again in view of the tendency of these lists to maintain their order, it is probably preferable to adjust the boundary, and to start the first-year group of 205 with 1057.1.[76].

3.6.4.

With these two adjustments, the recruits of 205 are as follows:

Century	First (highest) recruit	Number of recruits (n_2)
1=1	1057.1. [76]	85
2=2	1057.2. [80]	88
3=3	1057.3. [61]	61
4=7	1057.4. [64]	52
5=6	1057.5. [61]	83
6=4	1057.6. [36]	83
7=5	1057.7. [50]	44

For the percentage values of these figures, see 3.11.3.

3.7.1.

Having identified the recruits of 205, we may see how many of them fail to recur and how many do recur, and from this we can work out the value of r (the annual survival rate). The majority of the men survive en bloc, but some recur out of order because they have become immunes or principales (and on 1058 these are listed separately), and some recur in different centuries. In addition, there is a small group of men who appear for the first time in 210 but listed in with the sixth-year group (i.e. they should have appeared among our recruits of 205), and some of the names missing on the damaged portions on 1058 will have to be assigned to men in their sixth year (i.e. to recruits of 205).

3.7.2.

First, the survivals en bloc.

Century	Block of recruits in 205	Block of survivors in 210
1=1	1057.1. [76-160]	1058.1. [19-70]
2=2	1057.2. [80-167]	1058.2. [12-56] except [23, 34, 38]
3=3	1057.3. [61-121]	1058.3. [15-31] except [18, 26]
4=7	1057.4. [64-115]	1058.7. [22-49] except [24]
5=6	1057.5 [61-143]	1058.6. [8-48] except [17, 18, 37, 47]
6=4	1057.6. [36-118]	1058.4. [16-55] except [21, 39]
7=5	1057.7. [50-93]	1058.5. [19-50] except [31,34,36,41,42,43,45]

The exceptions listed in the last column will be accounted for in sections 3.7.4. and 3.7.5.

3.7.3.

Next, the men who remained in their original centuries but who recur in the lists of immunes and principales.

Century	Position in 205	Position in 210
1=1	[108]	[13]
	[109]	[12]
2=2	[87]	[4]
3=3	[62]	[8]
	[75]	[14]
4=7	[65]	[14]
	[66]	[17]
5=6	-	-
6=4	[48]	[11]
	[52]	[12]
7=5	[72]	[8]

3.7.4.

The men who recur as rankers but in different centuries are as follows:

Position in 205	Position in 210
1057.1.-	-
1057.2.[80]	1058.7.[21]
1057.2.[101]	1058.7.[24]
1057.2.[103]	1058.3.[26]
1057.2.[104]	1058.1.[18]
1057.2.[110]	1058.6.[17]
1057.2.[112]	1058.6.[18]
1057.2.[140]	1058.5.[45]
1057.3.[63]	1058.7.[4]
1057.3.[69]	1058.7.[20]
1057.3.[98]	1058.4.[39]
1057.4.-	-
1057.5.[62]	1058.4.[21]
[76]	5.[20]
[95]	5.[31]
[117]	5.[34]
[128]	5.[41]
[129]	5.[42]
[133]	5.[43]
1057.6.-	-
7. [60]	4. [5]

It will be seen that, taking into account the adjustments of sections 3.6.2. and 3.6.3., every one of these recruits of 205 is grouped, after transfer, with other former recruits of 205: this consistency confirms our analysis. These transfers account for most of the exceptions noted at 3.7.2.

3.7.5.

The remainder of the exceptions are a very interesting group. These are men who appear in 210 for the first time but who are grouped in a particular way. Seven of them are clearly grouped with the men in their sixth year:

1058.2.[23]
1058.2.[34]
1058.2.[38]
1058.3.[18]
1058.5.[36]
1058.6.[37]
1058.6.[47]

The other two, 1058.5.[17]and 1058.5.[18] occupy an ambiguous position between 1058.5.[16] (who, transferred from 1057.2.[79], has been assigned to his seventh or higher year of service in 210: see 3.6.2.) and 1058.5.[19] (the highest in the list of the men in their sixth year of service). The ambiguity is diminished if we reject the adjustment made at 3.6.2. and assign 1057.2. 79 (= 1058.5.[16])to the recruits of 205, though the next man up, 1058.5.[15], is certainly in his seventh or higher year. What is certain, however, is that these nine men now under consideration are the only men who appear for the first time in 210 in positions as described; otherwise, with two exceptions, the men appearing for the first time are all in their 5th or lower year of service. One of the exceptions is 1058.2.[8], who is clearly grouped in 210 with men in their 7th or higher year of service; there is no gap to which he can be conveniently assigned in 205, and his presence remains an anomaly. The other exception is 1058.5.[16], who is in his 7th or higher year of service, having been transferred from 1057.2.[79] (the only ranker in these years of service known to have been transferred: see 3.9.2.)

The simplest solution is to assign 1058.5.[17] and [18] to their sixth year of service, like the other six in the group. It follows that in 205 they should have been listed among the recruits of that year.

There are two possible explanations for their non-appearance on 1057. One is that they started off in another cohort and were transferred, a suggestion which, though logically possible, has nothing historical to support it (transfers between centuries are a different matter). The other is that they did appear, originally in the one portion of 1057 which is now missing: the bottom of the list of the third century (1057.3.[100-121])

where all that remains is the initial letter of fifteen of the praenomina. In this position they would be appropriately in their first year of service.

In the next section (3.7.6.) we shall see how these nine men thus help to fill what would otherwise be an inconsistently large number of gaps.

3.7.6.

The final group of survivors from the recruits of 205 are the men whose names may be presumed to have originally been present among the erased names on 1058. With a certain amount of reasonable guesswork they are as follows:

1058.1: none
1058.2: 2 immunes or principales
1058.3: 5 men (5 of the six missing after 1058.3.[31])
1058.4: 8 men (all 8 missing after 1058.4.[49])
1058.5: none
1058.6: 2 immunes or principales
1058.7: none

The other men whose names are missing may be assigned to other years of service (see 3.10.2.)

The 5 men missing from after 1058.3.[31] will have come from the only damaged portion of 1057.3., nos [100-121]. With the other 9 men assigned to this original position (see 3.7.5.) we have now accounted for 14 of these erased names: the losses from this portion are therefore taken to be 8.

3.7.7.

The totals of survivors from the recruits of 205 are therefore as follows:

Century in 205	Survivors					
	en bloc	as immunes or principales	transferred	first appearance in 210	erased on 1058	TOTAL PER CENTURY
1	52	2	-	-	-	54
2	42	1	7	-	2	52
3	15	2	3	9	5	34
4	27	2	-	-	-	29
5	37	-	7	-	2	46
6	38	2	-	-	8	48
7	24	1	1	-	-	26

3.8.1.

We can now perform the calculation outlined in the first paragraph of Section 3.3.2. Having established the number of recruits of 205 (n_2) and the number of them that survived over 6 years, the calculation is as follows:

the survivors from n_2 are reduced to $n_2.r^5$,

hence $r = \sqrt[5]{\frac{n_2.r^5}{n_2}}$

In other words, $r = \sqrt[5]{\frac{\text{(number of survivors)}}{\text{(number of recruits)}}}$

3.8.2.

The following table summarises the information obtained so far (columns b and c), the survivors in each century expressed as a percentage (column d), and finally the value of r for each century, (column e).

(a) Century	(b) Recruits of 205 (n_2)	(c) Survivors of recruits of 205	(d) % survivors	(e) r
1	85	54	63.53	.9133
2	88	52	59.09	.9001
3	61	34	55.74	.8896
4	52	29	55.77	.8898
5	83	46	55.42	.8886
6	83	48	57.83	.8962
7	44	26	59.09	.9001

These values of r are the keys which unlock the other secrets of VI. 1057 and 1058.

3.8.3.

From these values of r Dr. Hawkes has very kindly worked out a T-distribution with a 5% confidence interval and 6 degrees of freedom. This gives values of 0.888 and 0.905. In historical terms, this means that for as long as the survival rate may be considered to have remained unchanged, in 95% of all years each century is likely to have its precise survival rate lying between those two limits: while in the remaining 5% of years the rate could have lain outside those limits, though it need not.

3.9.1.

These limits will now be used to estimate how we should divide up the lists of names according to year-groups. By using these limits, in preference to using, for example, just the mean of the values of r, we can see the range of possibilities for assigning the men to appropriate groups: and it will be clear, in fact, that in most cases there is no choice, particularly with the nco's and technicians, who are of special interest.

3.9.2.

Let us start with the men in their 2nd to 6th years of service in 205. We have already defined the lower limit of these groups. The upper limit may be derived from a consideration of the number of rankers on 1058 who are certainly in their 7th or higher year of service, since they will already have appeared on 1057 in the portion containing men in their 2nd or higher year of service. They are as follows:

Century	Position	
1058.1.	[15]	(from 1057.1.[64])
	[16]	(from 1057.1.[75]: see 3.6.3.)
	[17]	(from 1057.1.[63])
1058.2.	[9]	(from 1057.2.[64])
	[10]	(from 1057.2.[66])
	[11]	(from 1057.2.[78])
1058.3.	-	
1058.4.	-	
1058.5.	[15]	(from 1057.7.[44])
	[16]	(transferred from 1057.2.[79])
1058.6.	[7]	(from 1057.5.[47])
1058.7.	-	

To these should be added:

1058.2.	[8]	(first appearance: see 3.6.3.)

At most, then, there are 10 rankers in their 7th or higher year of service: we may accordingly reckon that on 1057 a similar number may apply. We can use this presumption because the number involved is so small, so that any

error is negligible. In contrast, we cannot utilise the number of immunes and principales in this way, because too many are missing from 1058. The criterion, then, is the highest appearance of rankers on 1057, and this produces a reasonable result.

The group in their 7th or higher year of service on 1057 is as follows:

Century	Positions
1057.1	[1-5]
1057.2	[1-12]
1057.3	[1-7]
1057.4	[1-9]
1057.5	[1-6]
1057.6	[1-8]
1057.7	[1-7]

From this, the groups in their 2nd to 6 years inclusive are as follows:

Century	Positions		Number
1057.1	[6-75]	=	70
1057.2	[13-79]	=	67
1057.3	[8-60]	=	53
1057.4.	[10-63]	=	54
1057.5	[7-60]	=	54
1057.6	[9-35]	=	27
1057.7	[8-49]	=	42

3.9.3.

These men will have been recruited at the annual rate of n_1, and will be in year-groups as follows:

Year of service	Size of group
2	$n_1 r$
3	$n_1 r^2$
4	$n_1 r^3$
5	$n_1 r^4$
6	$n_1 r^5$
Total	$t_{1\,(2-6)}$

3.9.4.

From our formula for summing (3.3.2.) we can say that

$$t_{1\,(2\text{-}6)} = \frac{n.r(1 - r^5)}{(1 - r)}$$

When we substitute our two values of r, we find that

when $r = .888$, $t_{1\,(2\text{-}6)} = 3.5512\ (n_1)$

and when $r = .905$, $t_{1\,(2\text{-}6)} = 3.7467\ (n_1)$

3.9.5.

Since for each of our centuries the value of $t_{1\,(2\text{-}6)}$ is already known (3.9.2.) the value of n_1 can be found. Then we multiply n_1 by the corresponding value of r to obtain the number of men in each year group.

Century	$t_{1\,(2\text{-}6)}$	r	Year of service					
			n_1	2	3	4	5	6
1057.1	70	.888	19.7	17.5	15.5	13.8	12.3	10.9
		.905	18.7	16.9	15.3	13.8	12.5	11.3
1057.2	67	.888	18.9	16.8	14.9	13.2	11.7	10.4
		.905	17.9	16.2	14.6	13.3	12.0	10.9
1057.3	53	.888	14.9	13.3	11.8	10.5	9.3	8.2
		.905	14.1	12.8	11.6	10.5	9.5	8.6
1057.4) 1057.5)	54	.888	15.2	13.5	12.0	10.6	9.5	8.4
		.905	14.4	13.0	11.8	10.7	9.7	8.7
1057.6	27	.888	7.6	6.8	6.0	5.3	4.7	4.2
		.905	7.2	6.5	5.9	5.3	4.8	4.4
1057.7	42	.888	11.8	10.5	9.3	8.3	7.3	6.5
		.905	11.2	10.1	9.2	8.3	7.5	6.8

3.9.6.

Groups of these sizes will have the following lower limits in the lists:

Century	7+	6	5	4	3	2
1057.1	[5] [5]	[15.9] [16.3]	[28.1] [28.9]	[41.9] [42.7]	[57.5] [58.0]	[75.0] [75.0]
1057.2	[12] [12]	[22.4] [22.9]	[34.2] [34.9]	[47.4] [48.1]	[62.2] [62.8]	[79.0] [78.9]
1057.3	[7] [7]	[15.2] [15.6]	[24.5] [25.1]	[35.0] [35.6]	[46.7] [47.1]	[60.0] [59.9]
1057.4	[9] [9]	[17.4] [17.7]	[26.9] [27.4]	[37.5] [38.1]	[49.5] [49.9]	[63.0] [62.9]
1057.5	[6] [6]	[14.4] [14.7]	[23.9] [24.4]	[34.5] [35.1]	[46.5] [46.9]	[60.0] [59.9]
1057.6	[8] [8]	[12.2] [12.4]	[16.9] [17.2]	[22.2] [22.6]	[28.2] [28.5]	[35.0] [35.0]
1057.7	[7] [7]	[13.5] [13.8]	[20.9] [21.3]	[29.2] [29.6]	[38.5] [38.8]	[49.0] [49.0]

It is not claimed that a man could occupy two year-groups: that would be a misreading of these figures. But the reason why I have given these results to one decimal place is to show how little difference it makes which value we use for r. Moreover, the majority of the immunes and principales - whose positions are of crucial importance - are not on a border-line between two year-groups, and they may be assigned to the various years with reasonable confidence (see 3.12.1).

3.10.1.

Now we pass to the annual recruitment after 205, represented by the men on 1058 who are listed below the former recruits of 205. These men are in groups as follows:

$$n_3 + n_3r + n_3r^2 + n_3r^3 + n_3r^4 = t_{3(1-5)}$$

The formula for summing to give $t_{3(1-5)}$ is

$$t_{3(1-5)} = \frac{n_3(1-r^5)}{1-r}$$

With the two values for r which have already been worked out (3.8.3.) we find that

when $r = .888$, $t_{3(1-5)} = 3.9985(n_3)$

and when $r = .905$, $t_{3(1-5)} = 4.1360(n_3)$

3.10.2.

The table below shows the positions of rankers in their first five years on 1058 (allowing for the names missing from the damaged portions), their total number, $t_{3(1-5)}$, and the values of n_3 for each century corresponding to the two values of r.

Century	Positions	$t_{3(1-5)}$	n_3	
			r=.888	r=.905
1058.1	[71-170] + 5 after [83]	105	26.3	25.4
1058.2	[57-140] + 4 after [84]	88	22.0	21.3
1058.3	[32-139] + = after [31] & 13 after [113]	122	30.5	29.5
1058.4	[56-136] + 8 after [131]	89	22.3	21.5
1058.5	[51-138] + 12 after [72]	100	25.0	24.2
1058.6	[49-75] + 2 after [64]	29	7.3	7.0
1058.7	[50-155]	106	26.5	25.6

The total numbers of recruits will have been a little higher, but as too many of the immunes and principales are missing we cannot take these into account except to note that we have ignored them. Possibly we should add on 1 to 3 to each figure for annual recruitment.

3.10.3.

Since all the immunes and principales are listed together, there is no point (in this thesis, anyway) in dividing up the lists of rankers into year groups.

3.11.1.

We now come to the final stage of this analysis, in which we utilise some of the conclusions already obtained to analyse the lists of the 4 centuries which survive on VI.1056. Like 1057, also of 205, 1056 is set out with the nco's and technicians grouped according to length of service. There is a slight difference, however, in that there is a preponderance of immunes and principales at the tops of the 4 lists; but the presence of some of the immunes and principales lower down the lists confirms that 1056 shares the same pattern as 1057.

3.11.2.

This stage of the analysis will be far less precise than the foregoing, because we have to base it on the number of recruits of 205, and there is a wide range of possibilities for this. To overcome this gap in our information, we shall work out a T-distribution to show the range of percentages of recruits in the complete lists with a 5% confidence interval. For the value of r, the range of attested and calculated values is so small in comparison with the wide range of possibilities for the numbers of recruits that we shall use just the mean value obtainable from 1057, i.e. 0.897.

3.11.3.

The following table shows the number of men in each century on 1057, the number of recruits of 205 (n_2), and finally the percentage of recruits.

Century	Total Number	n_2	Percentage of recruits
1057.1	160	85	53.125%
1057.2	167	88	52.695%
1057.3	121	61	50.413%
1057.4	115	52	45.217%
1057.5	143	83	58.042%
1057.6	118	83	70.339%
1057.7	93	44	47.312%

Hence in 95% of cases, n_2 will tend to lie between 46% and 62% of the total number of men in each century. These percentages are surprisingly high, and cannot reflect a normal procedure. In fact, the size of n_2 means that in 205 the centuries were approximately doubled in size (both for 1056 and 1057). On the significance of this, see 5.2.1.

We now apply these limits to 1056 to obtain the limits for the numbers of recruits of 205 (n_2). These are as follows:

Century	Total number in century	Number of recruits (n_2)	
		62%	46%
1056.1	120	74.4	55.2
1056.2	121	75.0	55.7
1056.3	112	69.4	51.5
1056.4	137	84.9	63.0

These men will have been listed at the bottoms of the lists.

3.11.4.

The upper limit of the group in their 2nd to 6th years of service may be defined by subtracting from the list the men who are assignable to their 7th or higher year. Our main guide is derived from 1058, where we know which men belong to the group in their 7th or higher year. We lose a little precision because some of the immunes and principales are erased and some of these would have been in their 7th or higher year of service. But it is significant that very few rankers belong to this group, and our best course is to estimate a similar number of rankers for 1056, and draw the line accordingly. The numbers of rankers in this group on 1058 are indicated in section 3.9.2., where we used a similar method dividing up 1057.

On 1056, as we have already observed (3.11.1.), the immunes and principales are concentrated at the tops of the lists, which implies that most of them will be in their 7th or higher year of service (otherwise a

greater number of rankers would be intermingled with them). It is correspondingly less likely that rankers would tend to belong to this group. Our criterion, therefore, will be the position of the first (highest) ranker in each century. The divisions are thus as follows:

Century	First ranker	7+ group	First in 2nd-6th group
1056.1	[8]	[1-8]	[9]
1056.2	[8]	[1-8]	[9]
1056.3	[10]	[1-10]	[11]
1056.4	[10]	[1-10]	[11]

3.11.5

We can now determine the limits for the size of the group comprising the men in their 2nd to 6th years. These will be the total number in the century less those in their 7th or higher year (y) and less the recruits of 205 (n_2), and are indicated in the final column of the table below.

Century	Total in century	y	n_2	$t_{1\ (2-6)}$
1056.1	120	8	74.4 55.2	37.6 56.8
1056.2	121	8	75.0 55.7	38.0 57.3
1056.3	112	10	69.4 51.5	32.6 50.5
1056.4	137	10	84.9 63.0	42.1 64.0

3.11.6

As at section 3.9.4., we can say that the totals $t_{1\ (2-6)}$ can be summed as

$$t_{1\ (2-6)} = \frac{n_1(r-r^6)}{1-r}$$

In this case, we are using the value for r of .897. Hence $t_{1(2-6)} = 3.651(n_1)$.

The following two tables correspond to the two tables in sections 3.9.5 and 3.9.6, the first of them showing the numbers of men in each of the year groups 2 to 6, and the second showing the lower limits of the groups in the actual lists.

Century	t_1 (2-6)	n_1	Year				
			2	3	4	5	6
			$n_1 r$	$n_1 r^2$	$n_1 r^3$	$n_1 r^4$	$n_1 r^5$
1056.1	37.6 56.8	10.297 15.555	9.237 13.953	8.285 12.516	7.432 11.227	6.667 10.071	5.980 9.033
1056.2	38.0 57.3	10.407 15.692	9.335 14.076	8.373 12.626	7.511 11.325	6.737 10.159	6.043 9.113
1056.3	32.6 50.5	8.928 13.830	8.008 12.406	7.184 11.128	6.444 9.982	5.780 8.954	5.185 8.031
1056.4	42.1 64.0	11.530 17.527	10.342 15.722	9.277 14.203	8.321 12.650	7.464 11.347	6.695 10.178

Century	Year						
	7+	6	5	4	3	2	1
1056.1	[8] [8]	[14.0] [17.0]	[20.6] [27.1]	[28.1] [38.3]	[36.4] [50.8]	[45.6] [64.8]	[120.0] [120.0]
1056.2	[8] [8]	[14.0] [17.1]	[20.8] [27.3]	[28.3] [38.6]	[36.7] [51.2]	[46.0] [65.3]	[121.0] [121.0]
1056.3	[10] [10]	[15.2] [18.0]	[21.0] [27.0]	[27.4] [37.0]	[35.0] [48.1]	[42.6] [60.5]	[112.0] [112.0]
1056.4	[10] [10]	[16.7] [20.2]	[24.2] [31.5]	[32.5] [44.2]	[41.8] [58.3]	[52.1] [74.0]	[137.0] [137.0]

3.12.1.

In this section the analysis of 1057 is set out fully, followed at 3.12.2 and 3.12.3 by the analyses of 1058 and 1056.

Column A gives the positions of the men.

Column B gives the abbreviated titles of any post held, as far as possible exactly as written on the stone; a dash - shows that no post was held.

Column C shows whether and where a man recurred on 1058. Where no century is indicated, he recurred in the same century; where he changed century the century is indicated. An asterisk * indicates that on 1058 he held some post. A dash - indicates that a man does not recur. ? indicates that the man might have recurred (for these men, see 3.7.6).

Column D shows the estimated year of service. 7+ indicates "seventh or higher".

1057.1 (=1058.1)

A	B	C	D	A	B	C	D
[1]	B $\overline{PR}$	-	7+	[26]	-	-	5
[2]	IMC	-	7+	[27]	-	-	5
[3]	B TR	4. 7 *	7+	[28]	-	-	5
[4]	TES	-	7+	[29]	-	-	4
[5]	-	-	7+	[30]	-	-	4
[6]	OPT 7	-	6	[31]	-	-	4
[7]	VEX	-	6	[32]	-	-	4
[8]	-	-	6	[33]	-	-	4
[9]	-	-	6	[34]	-	-	4
[10]	L $\overline{TR}$	7 *	6	[35]	-	-	4
[11]	ABAL	-	6	[36]	-	-	4
[12]	-	-	6	[37]	-	-	4
[13]	-	-	6	[38]	-	-	4
[14]	-	-	6	[39]	-	-	4
[15]	S $\overline{TR}$	8 *	6	[40]	-	-	4
[16]	-	-	6 or 5	[41]	-	-	4
[17]	-	-	5	[42]	C $\overline{TR}$	9 *	4 or 3
[18]	-	-	5	[43]	-	-	3
[19]	-	-	5	[44]	-	-	3
[20]	-	-	5	[45]	-	-	3
[21]	OPA	-	5	[46]	-	14 *	3
[22]	-	-	5	[47]	-	-	3
[23]	-	-	5	[48]	-	-	3
[24]	-	-	5	[49]	-	-	3
[25]	-	-	5	[50]	S TR	10 *	3

1057.1 (cont)

A	B	C	D	A	B	C	D
[51]	-	-	3	[76]	-	-	1
[52]	-	-	3	[77]	-	-	1
[53]	-	-	3	[78]	-	[19]	1
[54]	-	-	3	[79]	-	[20]	1
[55]	-	-	3	[80]	-	[21]	1
[56]	BVC	-	3	[81]	-	[22]	1
[57]	B $\overline{\text{PR}}$	-	3	[82]	-	[23]	1
[58]	-	-	3 or 2	[83]	-	[24]	1
[59]	-	-	2	[84]	-	[25]	1
[60]	-	-	2	[85]	-	-	1
[61]	-	-	2	[86]	-	[26]	1
[62]	-	-	2	[87]	-	[27]	1
[63]	-	[17]	2	[88]	-	-	1
[64]	-	[15]	2	[89]	-	[28]	1
[65]	G TR	-	2	[90]	-	[29]	1
[66]	-	-	2	[91]	-	-	1
[67]	-	-	2	[92]	-	-	1
[68]	-	-	2	[93]	-	-	1
[69]	-	-	2	[94]	BVC	-	1
[70]	-	-	2	[95]	-	[30]	1
[71]	-	-	2	[96]	-	-	1
[72]	-	-	2	[97]	-	-	1
[73]	S $\overline{\text{TR}}$	[11]	2	[98]	-	[31]	1
[74]	-	-	2	[99]	-	[32]	1
[75]	-	[16]	2	[100]	-	[33]	1

1057.1 (cont)

A	B	C	D	A	B	C	D
[101]	-	[34]	1	[126]	-	-	1
[102]	-	[35]	1	[127]	-	-	1
[103]	-	[36]	1	[128]	-	[51]	1
[104]	-	[37]	1	[129]	-	[52]	1
[105]	-	[38]	1	[130]	-	[53]	1
[106]	-	[39]	1	[131]	-	[54]	1
[107]	-	-	1	[132]	-	[55]	1
[108]	GTR	[13]	1	[133]	-	-	1
[109]	-	[12]	1	[134]	-	[56]	1
[110]	-	-	1	[135]	-	[57]	1
[111]	-	[40]	1	[136]	-	[58]	1
[112]	-	[41]	1	[137]	-	[59]	1
[113]	-	-	1	[138]	-	-	1
[114]	-	[42]	1	[139]	-	-	1
[115]	-	-	1	[140]	-	[60]	1
[116]	-	[43]	1	[141]	-	-	1
[117]	-	[47]	1	[142]	-	-	1
[118]	-	[44]	1	[143]	-	[61]	1
[119]	-	[45]	1	[144]	-	-	1
[120]]	-	-	1	[145]	-	[62]	1
[121]	-	-	1	[146]	-	[63]	1
[122]	-	[46]	1	[147]	-	-	1
[123]	-	[48]	1	[148]	-	-	1
[124]	-	[49]	1	[149]	-	[64]	1
[125]	-	[50]	1	[150]	-	[65]	1

1057.1 (cont)

A	B	C	D
[151]	-	[66]	1
[152]	-	[67]	1
[153]	-	-	1
[154]	-	-	1
[155]	-	[68]	1
[156]	-	-	1
[157]	-	-	1
[158]	-	[69]	1
[159]	-	[70]	1
[160]	-	-	1

1057.2 (= 1058.2)

A	B	C	D	A	B	C	D
[1]	BS PR	-	7+	[26]	-	-	5
[2]	OP 7	-	7+	[27]	-	-	5
[3]	VEX 7	-	7+	[28]	-	-	5
[4]	B PR	-	7+	[29]	-	-	5
[5]	TES 7	-	7+	[30]	-	-	5
[6]	EMR	-	7+	[31]	-	-	5
[7]	B TR	-	7+	[32]	-	-	5
[8]	AQCO	-	7+	[33]	-	-	5
[9]	ORPR	-	7+	[34]	-	-	5
[10]	OPCA	3.[5]*	7+	[35]	-	-	4
[11]	-	-	7+	[36]	SETR	4.[8]*	4
[12]	-	-	7+	[37]	-	-	4
[13]	B TR	-	6	[38]	-	-	4
[14]	-	-	6	[39]	-	-	4
[15]	-	-	6	[40]	-	-	4
[16]	-	-	6	[41]	-	-	4
[17]	-	-	6	[42]	-	-	4
[18]	-	-	6	[43]	-	-	4
[19]	-	-	6	[44]	-	-	4
[20]	-	-	6	[45]	-	-	4
[21]	-	-	6	[46]	-	-	4
[22]	-	-	6	[47]	-	-	4
[23]	-	-	5	[48]	-	-	4 or 3
[24]	-	-	5	[49]	-	-	3
[25]	-	-	5	[50]	-	-	3

1057.2 (cont)

A	B	C	D	A	B	C	D
[51]	-	-	3	[76]	-	-	2
[52]	-	-	3	[77]	-	-	2
[53]	-	-	3	[78]	-	[11]	2
[54]	-	-	3	[79]	-	5.[16]*	2
[55]	-	-	3	[80]	-	7.[21]	1
[56]	-	-	3	[81]	-	-	1
[57]	-	-	3	[82]	-	-	1
[58]	-	-	3	[83]	-	[12]	1
[59]	-	-	3	[84]	-	[13]	1
[60]	-	-	3	[85]	-	[14]	1
[61]	-	-	3	[86]	-	[15]	1
[62]	ACPR	-	3	[87]	HO	[4]*	1
[63]	-	-	2	[88]	-	-	1
[64]	-	[9]	2	[89]	-	[16]	1
[65]	-	-	2	[90]	-	[17]	1
[66]	-	[10]	2	[91]	-	[18]	1
[67]	-	-	2	[92]	-	-	1
[68]	-	[2]*	2	[93]	-	[19]	1
[69]	-	-	2	[94]	-	[20]	1
[70]	-	-	2	[95]	-	[21]	1
[71]	-	-	2	[96]	-	[22]	1
[72]	SETR	-	2	[97]	-	[24]	1
[73]	-	-	2	[98]	-	[25]	1
[74]	-	-	2	[99]	-	[26]	1
[75]	-	-	2	[100]	-	-	1

1057.2 (cont)

A	B	C	D	A	B	C	D
[101]	-	7.[24]	1	[126]	-	[43]	1
[102]	-	-	1	[127]	-	-	1
[103]	-	3.[26]	1	[128]	-	-	1
[104]	-	1.[18]	1	[129]	-	[44]	1
[105]	-	-	1	[130]	-	[45]	1
[106]	-	[27]	1	[131]	-	[46]	1
[107]	SETR	-	1	[132]	-	-	1
[108]	-	[28]	1	[133]	-	-	1
[109]	-	[29]	1	[134]	-	-	1
[110]	-	6.[17]	1	[135]	-	[47]	1
[111]	-	[30]	1	[136]	-	-	1
[112]	-	6.[18]	1	[137]	-	-	1
[113]	-	[31]	1	[138]	-	[48]	1
[114]	-	-	1	[139]	-	-	1
[115]	-	[32]	1	[140]	-	5.[45]	1
[116]	-	[33]	1	[141]	-	[49]	1
[117]	-	[35]	1	[142]	-	-	1
[118]	-	[36]	1	[143]	-	-	1
[119]	-	[37]	1	[144]	-	-	1
[120]	-	-	1	[145]	-	-	1
[121]	-	[39]	1	[146]	-	-	1
[122]	-	[40]	1	[147]	-	-	1
[123]	-	-	1	[148]	-	-	1
[124]	-	[41]	1	[149]	-	-	1
[125]	-	[42]	1	[150]	-	-	1

1057.2 (cont)

A	B	C	D
[151]	-	-	1
[152]	-	-	1
[153]	-	-	1
[154]	-	[50]	1
[155]	-	-	1
[156]	-	[51]	1
[157]	-	[52]	1
[158]	-	-	1
[159]	-	[53]	1
[160]	-	-	1
[161]	-	-	1
[162]	-	[54]	1
[163]	-	-	1
[164]	-	[55]	1
[165]	-	-	1
[166]	-	[56]	1
[167]	-	-	1

1057.3 (=1058.3)

A	B	C	D	A	B	C	D
[1]	AQP	-	7+	[26]	-	-	4
[2]	VEX	-	7+	[27]	-	-	4
[3]	OP7	[3]*	7+	[28]	-	-	4
[4]	VIC	-	7+	[29]	-	-	4
[5]	TAB	[1]*	7+	[30]	-	-	4
[6]	-	-	7+	[31]	-	-	4
[7]	-	-	7+	[32]	-	-	4
[8]	TES	[4]*	6	[33]	-	-	4
[9]	-	-	6	[34]	-	-	4
[10]	-	-	6	[35]	ST	[7]*	4
[11]	ST	-	6	[36]	-	-	3
[12]	-	-	6	[37]	-	-	3
[13]	BTR	-	6	[38]	-	-	3
[14]	-	-	6	[39]	-	-	3
[15]	-	-	6	[40]	-	-	3
[16]	-	-	5	[41]	-	-	3
[17]	-	-	5	[42]	-	-	3
[18]	OPC	-	5	[43]	-	-	3
[19]	-	-	5	[44]	-	-	3
[20]	-	-	5	[45]	-	7. [18] *	3
[21]	-	-	5	[46]	-	-	3
[22]	-	-	5	[47]	-	-	3 or 2
[23]	-	-	5	[48]	-	-	2
[24]	BPR	[2]*	5	[49]	-	-	2
[25]	-	-	5 or 4	[50]	-	-	2

1057.3 (cont)

A	B	C	D	A	B	C	D
[51]	-	-	2	[76]	-	[21]	1
[52]	-	-	2	[77]	-	[22]	1
[53]	-	[13]*	2	[78]	-	[23]	1
[54]	-	-	2	[79]	-	[24]	1
[55]	-	-	2	[80]	-	[25]	1
[56]	-	-	2	[81]	-	-	1
[57]	-	-	2	[82]	-	[27]	1
[58]	-	-	2	[83]	-	[28]	1
[59]	-	-	2	[84]	-	[29]	1
[60]	-	-	2	[85]	-	-	1
[61]	-	-	1	[86]	-	[30]	1
[62]	GTR	[8]*	1	[87]	-	[31]	1
[63]	-	7.[4]*	1	[88]	-	-	1
[64]	-	[15]	1	[89]	-	-	1
[65]	-	-	1	[90]	-	-	1
[66]	-	[16]	1	[91]	-	-	1
[67]	-	-	1	[92]	-	-	1
[68]	-	[17]	1	[93]	-	-	1
[69]	GTR	7.[20]	1	[94]	-	-	1
[70]	AQP	-	1	[95]	-	-	1
[71]	-	[19]	1	[96]	-	-	1
[72]	-	[20]	1	[97]	-	-	1
[73]	-	-	1	[98]	-	4.[39]	1
[74]	-	-	1	[99]	-	-	1
[75]	-	14 *	1	[100]	-	?	1

1057.3 (cont)

A	B	C	D
[101]	-	?	1
[102]	-	?	1
[103]	-	?	1
[104]	-	?	1
[105]	-	?	1
[106]	-	?	1
[107]	-	?	1
[108]	-	?	1
[109]	-	?	1
[110]	-	?	1
[111]	-	?	1
[112]	-	?	1
[113]	-	?	1
[114]	-	?	1
[115]	-	?	1
[116]	-	?	1
[117]	-	?	1
[118]	-	?	1
[119]	-	?	1
[120]	-	?	1
[121]	-	?	1

1057.4 (=1058.7)

A	B	C	D	A	B	C	D
[1]	PR.PR	-	7+	[26]	-	-	5
[2]	COR.PR	-	7+	[27]	-	-	5 or 4
[3]	..MI	-	7+	[28]	-	-	4
[4]	TESS	-	7+	[29]	-	-	4
[5]	OPT	-	7+	[30]	-	-	4
[6]	OPB	[2]*	7+	[31]	-	-	4
[7]	VEX	[3]*	7+	[32]	-	-	4
[8]	-	-	7+	[33]	-	-	4
[9]	-	-	7+	[34]	-	[16]*	4
[10]	-	-	6	[35]	-	-	4
[11]	CPC	[15]*	6	[36]	-	-	4
[12]	-	[1]*	6	[37]	-	-	4
[13]	-	-	6	[38]	-	-	4 or 3
[14]	-	-	6	[39]	-	-	3
[15]	-	-	6	[40]	-	[7]*	3
[16]	-	-	6	[41]	-	-	3
[17]	-	5.[5]*	6	[42]	-	-	3
[18]	BETR	-	5	[43]	-	-	3
[19]	BETR	-	5	[44]	S TR	[10]*	3
[20]	-	-	5	[45]	-	-	3
[21]	-	-	5	[46]	-	-	3
[22]	-	-	5	[47]	-	-	3
[23]	-	-	5	[48]	-	-	3
[24]	-	-	5	[49]	-	-	3
[25]	-	-	5	[50]	-	-	2

1057.4 (cont)

A	B	C	D	A	B	C	D
[51]	BVC	-	2	[76]	-	[26]	1
[52]	-	-	2	[77]	-	[27]	1
[53]	-	-	2	[78]	-	-	1
[54]	-	-	2	[79]	-	-	1
[55]	-	-	2	[80]	-	[28]	1
[56]	-	-	2	[81]	-	[29]	1
[57]	-	-	2	[82]	-	[30]	1
[58]	-	-	2	[83]	-	-	1
[59]	-	-	2	[84]	-	-	1
[60]	-	-	2	[85]	-	[31]	1
[61]	-	-	2	[86]	-	[32]	1
[62]	-	-	2	[87]	-	[33]	1
[63]	-	-	2	[88]	-	-	1
[64]	-	-	1	[89]	-	[34]	1
[65]	-	[14]*	1	[90]	-	[35]	1
[66]	-	[17]*	1	[91]	-	[36]	1
[67]	-	-	1	[92]	-	[37]	1
[68]	-	-	1	[93]	-	[38]	1
[69]	-	-	1	[94]	-	-	1
[70]	-	-	1	[95]	-	[39]	1
[71]	-	[22]	1	[96]	-	-	1
[72]	-	-	1	[97]	-	[40]	1
[73]	-	[23]	1	[98]	-	[41]	1
[74]	-	-	1	[99]	-	[42]	1
[75]	-	[25]	1	[100]	-	-	1

1057.4 (cont)

A	B	C	D
[101]	-	-	1
[102]	-	-	1
[103]	-	[43]	1
[104]	-	-	1
[105]	-	[44]	1
[106]	-	[45]	1
[107]	-	-	1
[108]	-	[46]	1
[109]	-	-	1
[110]	-	[47]	1
[111]	-	-	1
[112]	-	[48]	1
[113]	-	-	1
[114]	-	[49]	1
[115]	-	-	1

1057.5 (= 1058.6)

A	B	C	D	A	B	C	D
[1]	CoRT	-	7+	[26]	-	-	4
[2]	BF	-	7+	[27]	GT	-	4
[3]	TES	-	7+	[28]	-	-	4
[4]	OPT	-	7+	[29]	-	-	4
[5]	-	-	7+	[30]	-	-	4
[6]	-	-	7+	[31]	-	-	4
[7]	VEX	-	6	[32]	-	-	4
[8]	SIF	-	6	[33]	-	-	4
[9]	-	-	6	[34]	-	-	4
[10]	-	-	6	[35]	-	-	4 or 3
[11]	-	-	6	[36]	-	-	3
[12]	SV	-	6	[37]	-	-	3
[13]	-	-	6	[38]	-	-	3
[14]	-	-	6	[39]	-	-	3
[15]	AB	-	5	[40]	-	-	3
[16]	-	-	5	[41]	-	-	3
[17]	-	-	5	[42]	-	-	3
[18]	-	-	5	[43]	-	-	3
[19]	-	-	5	[44]	ST	-	3
[20]	-	-	5	[45]	-	-	3
[21]	-	-	5	[46]	-	-	3
[22]	-	-	5	[47]	-	[7]	2
[23]	-	-	5	[48]	-	-	2
[24]	SIF	-	5 or 4	[49]	-	-	2
[25]	-	-	4	[50]	-	-	2

1057.5 (cont)

A	B	C	D	A	B	C	D
[51]	-	7.[5]*	2	[76]	-	5.[20]	1
[52]	-	-	2	[77]	-	[16]	1
[53]	-	-	2	[78]	-	-	1
[54]	-	-	2	[79]	-	-	1
[55]	-	-	2	[80]	-	-	1
[56]	-	-	2	[81]	B	-	1
[57]	-	-	2	[82]	-	-	1
[58]	-	-	2	[83]	-	-	1
[59]	-	-	2	[84]	-	[19]	1
[60]	GT	-	2	[85]	-	-	1
[61]	-	-	1	[86]	GT	-	1
[62]	-	4.[21]	1	[87]	-	-	1
[63]	-	[9]	1	[88]	-	[20]	1
[64]	-	[8]	1	[89]	-	[21]	1
[65]	-	-	1	[90]	-	-	1
[66]	-	[10]	1	[91]	-	[23]	1
[67]	-	[11]	1	[92]	-	[24]	1
[68]	-	[12]	1	[93]	-	-	1
[69]	-	[13]	1	[94]	-	-	1
[70]	-	-	1	[95]	-	5.[31]	1
[71]	-	-	1	[96]	-	[25]	1
[72]	-	-	1	[97]	-	[26]	1
[73]	-	-	1	[98]	-	-	1
[74]	-	[14]	1	[99]	-	-	1
[75]	-	[15]	1	[100]	-	[27]	1

1057.5 (cont)

A	B	C	D
[101]	-	[28]	1
[102]	-	-	1
[103]	-	[29]	1
[104]	-	-	1
[105]	-	[30]	1
[106]	-	[31]	1
[107]	-	[32]	1
[108]	-	[33]	1
[109]	-	-	1
[110]	-	[34]	1
[111]	-	[35]	1
[112]	-	[36]	1
[113]	-	-	1
[114]	-	[38]	1
[115]	-	[39]	1
[116]	-	-	1
[117]	-	5.[34]	1
[118]	-	-	1
[119]	-	-	1
[120]	-	-	1
[121]	-	-	1
[122]	-	[40]	1
[123]	-	-	1
[124]	-	-	1
[125]	-	-	1
[126]	-	-	1
[127]	-	-	1
[128]	-	5.[41]	1
[129]	-	5.[42]	1
[130]	-	[41]	
[131]	0	-	1
[132]	-	-	1
[133]	-	5.[43]	1
[134]	-	-	1
[135]	-	[42]	1
[136]	-	-	1
[137]	-	[43]	1
[138]	-	-	1
[139]	-	[44]	1
[140]	-	[45]	1
[141]	-	-	1
[142]	-	[46]	1
[143]	-	[48]	1

1057.6 (= 1058.4)

A	B	C	D	A	B	C	D
[1]	B PR	-	7+	[26]	-	-	3
[2]	IMC	[3]*	7+	[27]	-	-	3
[3]	OPT7	-	7+	[28]	-	-	3
[4]	VEX	[4]*	7+	[29]	-	-	2
[5]	IMA	[1]*	7+	[30]	-	-	2
[6]	TES 7	[6]*	7+	[31]	-	-	2
[7]	-	-	7+	[32]	-	-	2
[8]	-	-	7+	[33]	-	-	2
[9]	B TR	-	6	[34]	-	-	2
[10]	-	-	6	[35]	-	-	2
[11]	ABA	[15]*	6	[36]	-	-	1
[12]	AQV	-	6	[37]	-	[16]	1
[13]	OPCO	3.[6]*	5	[38]	-	-	1
[14]	-	-	5	[39]	GOTR	-	1
[15]	-	-	5	[40]	-	-	1
[16]	-	-	5	[41]	-	-	1
[17]	-	-	5 or 4	[42]	-	[17]	1
[18]	BTR	-	4	[43]	-	[18]	1
[19]	ST	-	4	[44]	-	-	1
[20]	-	-	4	[45]	-	-	1
[21]	-	-	4	[46]	-	[19]	1
[22]	-	-	4	[47]	-	[20]	1
[23]	-	-	3	[48]	GTR	[11]*	1
[24]	BV	[10]*	3	[49]	-	-	1
[25]	-	-	3	[50]	-	-	1

1057.6 (cont)

A	B	C	D	A	B	C	D
[51]	-	-	1	[76]	-	[34]	1
[52]	-	[12]*	1	[77]	-	-	1
[53]	-	[22]	1	[78]	-	-	1
[54]	-	-	1	[79]	-	[35]	1
[55]	-	-	1	[80]	-	-	1
[56]	-	-	1	[81]	-	[36]	1
[57]	-	[23]	1	[82]	-	[37]	1
[58]	-	[24]	1	[83]	-	[38]	1
[59]	-	-	1	[84]	-	-	1
[60]	-	[25]	1	[85]	-	[40]	1
[61]	-	-	1	[86]	-	[41]	1
[62]	-	-	1	[87]	-	[42]	1
[63]	-	[26]	1	[88]	-	[43]	1
[64]	-	-	1	[89]	-	-	1
[65]	-	[27]	1	[90]	-	[44]	1
[66]	-	-	1	[91]	-	[45]	1
[67]	-	[28]	1	[92]	-	[46]	1
[68]	-	[29]	1	[93]	-	-	1
[69]	-	[30]	1	[94]	-	[47]	1
[70]	-	[31]	1	[95]	-	[48]	1
[71]	-	-	1	[96]	-	-	1
[72]	-	[32]	1	[97]	-	[49]	1
[73]	-	[33]	1	[98]	-	-	1
[74]	-	-	1	[99]	-	-	1
[75]	-	-	1	[100]	-	-	1

1057.6 (cont)

A	B	C	D
[101]	-	-	1
[102]	-	-	1
[103]	-	-	1
[104]	-	-	1
[105]	-	-	1
[106]	-	-	1
[107]	-	-	1
[108]	-	-	1
[109]	-	-	1
[110]	-	-	1
[111]	-	-	1
[112]	-	[50]	1
[113]	-	[51]	1
[114]	-	[52]	1
[115]	-	[53]	1
[116]	-	-	1
[117]	-	[54]	1
[118]	-	[55]	1

1057.7 (= 1058.5)

A	B	C	D	A	B	C	D
[1]	OPTB	-	7+	[26]	-	-	4
[2]	VNC	-	7+	[27]	-	-	4
[3]	VEX7	-	7+	[28]	-	-	4
[4]	KARC	-	7+	[29]	-	-	4
[5]	HEMB	[6]*	7+	[30]	-	-	3
[6]	-	-	7+	[31]	-	-	3
[7]	-	-	7+	[32]	-	-	3
[8]	BVCC	[9]*	6	[33]	-	-	3
[9]	TES	-	6	[34]	EXCT	[7]*	3
[10]	-	-	6	[35]	-	-	3
[11]	S//	-	6	[36]	-	-	3
[12]	//C	-	6	[37]	-	-	3
[13]	STR	-	6	[38]	-	-	3
[14]	-	-	5	[39]	-	-	2
[15]	OP7	[3]*	5	[40]	-	-	2
[16]	-	-	5	[41]	-	[13]*	2
[17]	-	-	5	[42]	-	-	2
[18]	-	-	5	[43]	-	-	2
[19]	-	-	5	[44]	-	[15]	2
[20]	-	-	5	[45]	-	-	2
[21]	GTR	-	5 or 4	[46]	-	-	2
[22]	-	-	4	[47]	-	-	2
[23]	-	-	4	[48]	-	-	2
[24]	-	-	4	[49]	-	-	2
[25]	-	-	4	[50]	-	-	1

1057.7 (cont)

A	B	C	D	A	B	C	D
[51]	-	[19]	1	[76]	-	-	1
[52]	-	[21]	1	[77]	-	[40]	1
[53]	-	[22]	1	[78]	-	-	1
[54]	-	-	1	[79]	-	[44]	1
[55]	-	[23]	1	[80]	-	-	1
[56]	-	-	1	[81]	-	-	1
[57]	-	[24]	1	[82]	-	-	1
[58]	-	-	1	[83]	-	[46]	1
[59]	-	-	1	[84]	-	-	1
[60]	-	4.[5]*	1	[85]	-	[47]	1
[61]	-	[25]	1	[86]	-	-	1
[62]	-	[26]	1	[87]	-	-	1
[63]	-	[27]	1	[88]	-	-	1
[64]	-	[28]	1	[89]	-	[48]	1
[65]	-	[29]	1	[90]	-	[49]	1
[66]	-	[30]	1	[91]	-	-	1
[67]	-	-	1	[92]	-	-	1
[68]	-	[32]	1	[93]	-	[50]	1
[69]	-	[33]	1				
[70]	-	-	1				
[71]	-	[35]	1				
[72]	-	[8]*	1				
[73]	-	[37]	1				
[74]	-	[38]	1				
[75]	-	[39]	1				

3.12.2.

In this section the analysis of 1058 is set out.

Column E gives the positions of the men. Roman numerals are assigned to the men erased from the top of the stone.

Column F gives the abbreviated titles of any post held, as far as possible exactly as written on the stone. A dash - shows that no post was held. ? indicates that a post was held though because of the damage we do not know what it was.

Column G shows whether and where a man has already appeared on 1057. Where no century is indicated, he first appeared in the same century; where he has changed centuries, the original century is indicated. An asterisk * indicates that on 1057 he held some post. A dash indicates that a man is appearing for the first time. ? indicates that a man might have appeared on 1057 (special cases only, e.g. the men discussed at 3.7.6, and immunes and principales who might be more senior).

Column H shows the estimated year of service. As before, + indicates "or higher". ? indicates ignorance. In the few cases where a choice is indicated, the precise points of division may be found in the table at 3.9.6.

1058.1 (= 1057.1)

E	F	G	H	E	F	G	H
[i]	?	?	?	[23]	-	[82]	6
[ii]	?	?	?	[24]	-	[83]	6
[iii]	?	?	?	[25]	-	[84]	6
[1]	B PR	?	?	[26]	-	[86]	6
[2]	PRE C	?	?	[27]	-	[87]	6
[3]	IMC	?	?	[28]	-	[89]	6
[4]	VEX	?	?	[29]	-	[90]	6
[5]	OP	-	1-5	[30]	-	[95]	6
[6]	?	-	1-5	[31]	-	[98]	6
[7]	?	[10]*	11	[32]	-	[99]	6
[8]	?	[15]	11	[33]	-	[100]	6
[9]	?	[42]*	9 or 8	[34]	-	[101]	6
[10]	?	[50]*	8	[35]	-	[102]	6
[11]	BTR	[73]*	7	[36]	-	[103]	6
[12]	OPTC	[109]	6	[37]	-	[104]	6
[13]	STR	[108]*	6	[38]	-	[105]	6
[14]	ABAL	[46]	8	[39]	-	[106]	6
[15]	-	[64]	7	[40]	-	[111]	6
[16]	-	[75]	7	[41]	-	[112]	6
[17]	-	[63]	7	[42]	-	[114]	6
[18]	-	2.[104]	6	[43]	-	[116]	6
[19]	-	[78]	6	[44]	-	[118]	6
[20]	-	[79]	6	[45]	-	[119]	6
[21]	-	[80]	6	[46]	-	[122]	6
[22]	-	[81]	6	[47]	-	[117]	6

1058.1 (cont)

E	F	G	H
[48]	-	[123]	6
[49]	-	[124]	6
[50]x	-	[125]	6
[51]	-	[128]	6
[52]	-	[129]	6
[53]	-	[130]	6
[54]	CODTR	[131]	6
[55]	-	[132]	6
[56]	-	[134]	6
[57]	-	[135]	6
[58]	-	[136]	6
[59]	-	[137]	6
[60]	-	[140]	6
[61]	-	[143]	6
[62]	-	[145]	6
[63]	-	[146]	6
[64]	-	[149]	6
[65]	-	[150]	6
[66]	-	[151]	6
[67]	-	[152]	6
[68]	-	[155]	6
[69]	-	[158]	6
[70]	-	[159]	6

[71-170] including [iv,v,vi,vii,viii] after [83] , appear on 1058 for the first time, and are in their 1st to 5th years of service in 210.

1058.2 (= 1057.2)

E	E	G	H	E	F	G	H
[i]	?	?	?	[21]	-	[95]	6
[ii]	?	?	?	[22]	-	[96]	6
[iii]	?	?	?	[23]	-	?	?
[iv]	?	?	?	[24]	-	[97]	6
[v]	?	?	?	[25]	-	[98]	6
[1]	STR	?	?	[26]	-	[99]	6
[2]	COD	[68]	7	[27]	-	[106]	6
[3]	STR	-	?	[28]	-	[108]	6
[4]	hC	[87]*	6	[29]	-	[109]	6
[5]	CTR	-	?	[30]	-	[111]	6
[6]	CTR	-	?	[31]	-	[113]	6
[7]	CAR	-	?	[32]	-	[115]	6
[8]	-	-	7+	[33]	-	[116]	6
[9]	-	[64]	7	[34]	-	?	?
[10]	-	[66]	7	[35]	-	[117]	6
[11]	-	[78]	7	[36]	-	[118]	6
[12]	-	[83]	6	[37]	-	[119]	6
[13]	-	[84]	6	[38]	-	?	?
[14]	-	[85]	6	[39]	-	[121]	6
[15]	-	[86]	6	[40]	-	[122]	6
[16]	-	[89]	6	[41]	-	[124]	6
[17]	-	[90]	6	[42]	-	[125]	6
[18]	-	[91]	6	[43]	-	[126]	6
[19]	-	[93]	6	[44]	-	[129]	6
[20]	-	[94]	6	[45]	-	[130]	6

1058.2 (cont)

E	F	G	H
[46]	-	[131]	6
[47]	-	[135]	6
[48]	-	[138]	6
[49]	-	[141]	6
[50]	-	[154]	6
[51]	-	[156]	6
[52]	-	[157]	6
[53]	-	[159]	6
[54]	-	[162]	6
[55]	-	[164]	6
[56]	-	[166]	6

[57-140], including [vi, vii, viii, ix] after [84], appear for the first time on 1058 and are in their 1st to 5th years of service in 210.

1058.3 (= 1057.3)

E	F	G	H
[1]	CORPR	[5]*	12+
[2]	B PR	[24]*	10
[3]	AC.PR	[3]*	12+
[4]	VEX	[8]	11
[5]	OP 7	2.[10]*	12+
[6]	T 7	6.[13]*	10
[7]	BTR	[35]*	9
[8]	STR	[62]*	6
[9]	LIB	-	1-5
[10]	CTR	-	1-5
[11]	CTR	-	1-5
[12]	EXCTR	-	1-5
[13]	ABAL	[53]	7
[14]	VICT	[75]	6
[15]	-	[64]	6
[16]	-	[66]	6
[17]	-	[68]	6
[18]	-	?	?
[19]	-	[71]	6
[20]	-	[72]	6
[21]	-	[76]	6
[22]	-	[77]	6
[23]	-	[78]	6
[24]	-	[79]	6
[25]	-	[80]	6
[26]	-	2.[103]	6
[27]	-	[82]	6
[28]	-	[83]	6
[29]	-	[84]	6
[30]	-	[86]	6
[31]	-	[87]	6
[i]	-	?	6
[ii]	-	?	6
[iii]	-	?	6
[iv]	-	?	6
[v]	-	?	6

[32-139], with [vi] from before [32] and including [vii, viii, ix, x, xi, xii, xiii, xiv, xv, xvi, xvii, xviii and xix] from after [113], appear on 1058 for the first time, and are in their 1st to 5th years of service in 210.

1058.4 (= 1057.6)

E	F	G	H	E	F	G	H
[1]	CORPR	[5]*	12+	[26]	-	[63]	6
[2]	B PR	-	1-5	[27]	-	[65]	6
[3]	AQ PR	[2]*	12+	[28]	-	[67]	6
[4]	OP BA	[4]*	12+	[29]	-	[68]	6
[5]	VEX 7	7.[60]	6	[30]	-	[69]	6
[6]	OPT 7	[6]*	12+	[31]	-	[70]	6
[7]	TES 7	1.[3]*	12+	[32]	-	[72]	6
[8]	OPT C	2.[36]*	9	[33]	-	[73]	6
[9]	OPT C	-	1-5	[34]	-	[76]	6
[10]	BVC	[24]*	8	[35]	-	[79]	6
[11]	SEC TR	[48]*	6	[36]	-	[81]	6
[12]	S TR	[52]	6	[37]	-	[82]	6
[13]	CODTR	-	1-5	[38]	-	[83]	6
[14]	CODTR	-	1-5	[39]	-	3.[98]	6
[15]	BAR	[11]*	11	[40]	-	[85]	6
[16]	-	[37]	6	[41]	-	[86]	6
[17]	-	[42]	6	[42]	-	[87]	6
[18]	-	[43]	6	[43]	-	[88]	6
[19]	-	[46]	6	[44]	-	[90]	6
[20]	-	[47]	6	[45]	-	[91]	6
[21]	-	5.[62]	6	[46]	-	[92]	6
[22]	-	[53]	6	[47]	-	[94]	6
[23]	-	[57]	6	[48]	-	[95]	6
[24]	-	[58]	6	[49]	-	[97]	6
[25]	-	[60]	6	[1]	-	?	6

1058.4 (cont)

E	F	G	H
[ii]	-	?	6
[iii]	-	?	6
[iv]	-	?	6
[v]	-	?	6
[vi]	-	?	6
[vii]	-	?	6
[viii]	-	?	6
[50]	-	[112]	6
[51]	-	[113]	6
[52]	-	[114]	6
[53]	-	[115]	6
[54]	-	[117]	6
[55]	-	[118]	6

[56-131], including [ix,x,xi,xii,xiii, xiv,xv,xvi] after [131], appear on 1058 for the first time, and are in their 1st to 5th years of service in 210.

1058.5 (= 1057.7)

E	F	G	H	E	F	G	H
[1]	B PR	-	1-5	[26]	-	[62]	6
[2]	AQ PR	-	1-5	[27]	-	[63]	6
[3]	VEX	[15]*	10	[28]	-	[64]	6
[4]	OPT 7	-	1-5	[29]	-	[65]	6
[5]	TES 7	4. [17]	11	[30]	-	[66]	6
[6]	EMB	[5]*	12+	[31]	-	5. [95]	6
[7]	L S PR	[34]*	8	[32]	-	[68]	6
[8]	B PR	[72]	6	[33]	-	[69]	6
[9]	BVC	[8]*	11	[34]	-	5. [117]	6
[10]	S TR	-	1-5	[35]	-	[71]	6
[11]	S TR	-	1-5	[36]	-	?	?
[12]	S TR	-	1-5	[37]	-	[73]	6
[13]	AQA	[41]	7	[38]	-	[74]	6
[14]	COD	-	1-5	[39]	-	[75]	6
[15]	-	[44]	7	[40]	-	[77]	6
[16]	-	2. [79]	7	[41]	-	5. [128]	6
[17]	-	?	?	[42]	-	5. [129]	6
[18]	-	?	?	[43]	-	5. [133]	6
[19]	-	[51]	6	[44]	-	[79]	6
[20]	-	5. [76]	6	[45]	-	2. [140]	6
[21]	-	[52]	6	[46]	-	[83]	6
[22]	-	[53]	6	[47]	-	[85]	6
[23]	-	[55]	6	[48]	-	[89]	6
[24]	-	[57]	6	[49]	-	[90]	6
[25]	-	[61]	6	[50]	-	[93]	6

[51-138], including [i,ii,iii,iv,v,vi,vii,viii,ix,x,xi,xii] after [72], appear on 1058 for the first time, and are in their 1st to 5th years of service in 210.

1058.6 (= 1057.4)

E	F	G	H	E	F	G	H
[i]	?	?	?	[18]	-	2.[112]	6
[ii]	?	?	?	[19]	-	[84]	6
[iii]	?	?	?	[20]	-	[88]	6
[iv]	?	?	?	[21]	-	[89]	6
[v]	?	?	?	[22]	-	[90]	6
[vi]	?	?	?	[23]	-	[91]	6
[vii]	?	?	?	[24]	-	[92]	6
[viii]	?	?	?	[25]	-	[96]	6
[1]	S TR	?	?	[26]	-	[97]	6
[2]	S TR	?	?	[27]	-	[100]	6
[3]	EXC	?	?	[28]	-	[101]	6
[4]	CODTR	-	1-5	[29]	-	[103]	6
[5]	SIF	-	1-5	[30]	-	[105]	6
[6]	SIF	-	1-5	[31]	-	[106]	6
[7]	-	[47]	7	[32]	-	[107]	6
[8]	-	[64]	6	[33]	-	[108]	6
[9]	-	[63]	6	[34]	-	[110]	6
[10]	-	[66]	6	[35]	-	[111]	6
[11]	-	[67]	6	[36]	-	[112]	6
[12]	-	[68]	6	[37]	-	?	?
[13]	-	[69]	6	[38]	-	[114]	6
[14]	-	[74]	6	[39]	-	[115]	6
[15]	-	[75]	6	[40]	-	[122]	6
[16]	-	[77]	6	[41]	-	[130]	6
[17]	-	2.[110]	6	[42]	-	[135]	6

1058.6 (cont)

E	F	G	H
[43]	-	[137]	6
[44]	-	[139]	6
[45]	-	[140]	6
[46]	-	[142]	6
[47]	-	?	?
[48]	-	[143]	6

[49-75], including [i and ii] after [64], appear on 1058 for the first time, and are in their 1st to 5th years of service in 210.

1058.7 (= 1057.5)

E	F	G	H	E	F	G	H
[1]	COR S PR	[12]	11	[26]	-	[76]	6
[2]	B S PR	[6]*	12+	[27]	-	[77]	6
[3]	VEX.7	[7]*	12+	[28]	-	[80]	6
[4]	OPT 7	3.[63]	6	[29]	-	[81]	6
[5]	TESS 7	5.[51]	7	[30]	-	[82]	6
[6]	B TR	-	1-5	[31]	-	[85]	6
[7]	B TR	[40]*	8	[32]	-	[86]	6
[8]	B TR	-	1-5	[33]	-	[87]	6
[9]	EX.PR	-	1-5	[34]	-	[89]	6
[10]	OPT CONV	[44]*	8	[35]	-	[90]	6
[11]	S TR	-	1-5	[36]	-	[91]	6
[12]	STR	-	1-5	[37]	-	[92]	6
[13]	S TR	-	1-5	[38]	-	[93]	6
[14]	BVC	[65]	6	[39]	-	[95]	6
[15]	CACVS	[11]*	11	[40]	-	[97]	6
[16]	VNC COh	[34]	9	[41]	-	[98]	6
[17]	VNC COh	[66]	6	[42]	-	[99]	6
[18]	EM C	3.[45]	8	[43]	-	[103]	6
[19]	COD TR	-	1-5	[44]	-	[105]	6
[20]	-	3.[69]*	6	[45]	-	[106]	6
[21]	-	2.[80]	6	[46]	-	[108]	6
[22]	-	[71]	6	[47]	-	[110]	6
[23]	-	[73]	6	[48]	-	[112]	6
[24]	-	2.[101]	6	[49]	-	[114]	6
[25]	-	[75]	6				

[50 - 155] appear on 1058 for the first time, and are in their 1st to 5th years of service in 210.

3.12.3

In this section the analysis of VI.1056 is set out. There is a greater imprecision than with 1057 and 1058, as the range of possibilities for the proportions of recruits of A.D. 205 is wider than the range of values for the survival rate.

For each century, the estimated years of service are set out first, and then follows a list of the immunes and principales with their estimated years of service.

1056.1

Positions	Year of service
[1] to [8]	7+
[9] to [14]	6
[15] to [17]	6 or 5
[18] to [20]	5
[21] to [27]	5 or 4
[28]	4
[29] to [36]	4 or 3
[37] to [38]	4 or 3 or 2
[39] to [45]	3 or 2
[46] to [50]	3 or 2 or 1
[51] to [64]	2 or 1
[65] to [120]	1

Position	Post	Year of service
[1]	Q	7+
[2]	AQ	7+
[3]	OPT	7+
[4]	TES	7+
[5]	B T	7+
[6]	ST	7+
[7]	OC	7+
[10]	TR	6
[28]	S	4
[53]	VEX	2 or 1
[56]	ST	2 or 1

1056.2

Positions	Year of service
[1] to [8]	7+
[9] to [14]	6
[15] to [17]	6 or 5
[18] to [20]	5
[21] to [27]	5 or 4
[28]	4
[29] to [37]	4 or 3
[38]	4 or 3 or 2
[39] to [46]	3 or 2
[47] to [51]	3 or 2 or 1
[52] to [65]	2 or 1
[66] to [121]	1

Position	Post	Year of service
[1]	ES	7+
[2]	OP	7+
[3]	VEX	7+
[4]	TES	7+
[5]	ET	7+
[6]	VC	7+
[7]	ST	7+
[9]	B.T	6
[14]	EP	6
[52]	ST	2 or 1
[69]	EX $\overline{\text{PR}}$	1
[78]	C.T	1
[86]	C.T	1

1056.3

Positions	Year of service
[1] to [10]	7+
[11] to [15]	6
[16] to [18]	6 or 5
[19] to [20]	5
[21] to [27]	5 or 4
[28] to [35]	4 or 3
[36] to [37]	4 or 3 or 2
[38] to [43]	3 or 2 or 1
[44] to [61]	2 or 1
[62] to [112]	1

Position	Post	Year of service
[1]	S PR	7+
[2]	OC	7+
[3]	iM	7+
[4]	TESS	7+
[5]	OPT	7+
[6]	VEX	7+
[7]	EMER	7+
[8]	EMER	7+
[9]	B TR	7+
[11]	VIC	6
[12]	EM	6
[14]	V	6
[31]	ST	4 or 3
[38]	S	3 or 2 or 1
[41]	? T	3 or 2 or 1

1056.4

Positions	Year of service
[1] to [10]	7+
[11] to [17]	6
[18] to [20]	6 or 5
[21] to [24]	5
[25] to [32]	5 or 4
[33]	4
[34] to [42]	4 or 3
[43]	4 or 3 or 2
[44] to [51]	3 or 2
[52] to [58]	3 or 2 or 1
[59] to [74]	2 or 1
[75] to [137]	1

Position	Post	Year of service
[1]	~~PB~~ R	7+
[2]	C O	7+
[3]	VEX	7+
[4]	OP	7+
[5]	IM	7+
[6]	AQ	7+
[7]	EM	7+
[8]	~~BS~~	7+
[9]	TES	7+
[16]	S	6
[18]	OC	6 or 5
[26]	ST	5 or 4
[46]	ST	3 or 2
[47]	EM	3 or 2
[93]	C T	1
[98]	SN	1

CHAPTER 4

The basic evidence for equipment, techniques and operations

4.1.1

The difficulty with the Vigiles is to find a convenient point at which to start a study. Kellermann (1835) placed his study of the equipment at the beginning, while OR (1929) placed his near the end. In this present study, the material is arranged differently. A distinction is drawn between the direct evidence for equipment, techniques and operations on the one hand, and the conclusions as to the quality of the Vigiles on the other. This is because a list of equipment owned by a fire brigade gives no indication whether it was used effectively, nor even whether it was suitable for their particular risks. Moreover, even if the material provisions for a brigade remain unchanged, a change of personnel in the higher areas of command can completely transform a brigade, for better or for worse. We must, therefore, look at both the material provisions of the Vigiles, to see what was potentially available, and also at the factors governing such indeterminates as morale, standards of training, and nature of the fire risks. In this study, these two lines of enquiry are brought together in Chapter 8, at which point it is possible to answer the question: "If my own house or factory were on fire, would I welcome the Vigiles?"

4.1.2

In this present chapter, we look at the evidence for equipment and fire-fighting in a fairly basic way, to see what it implies for the potential effectiveness of the Vigiles. Although, unavoidably, reference is made to matters which are discussed in more detail elsewhere in this thesis, for example, architecture, nothing in this chapter relies on anything

which needs special discussion in the context of firefighting. Hence this chapter does not have a conclusion: that has to wait until Chapter 8. The one matter which is essential to this chapter and which is specially discussed elsewhere is the question of numbers; and here the analysis in Chapter 3 is used, so far as it is necessary at this point.

4.1.3

The history of firefighting in recent times provides clear warning that numbers are important. For example, the drills used in World War II by the Auxiliary Fire Service differ from those used in peace-time in that far more firemen were used; the lower standard of equipment was compensated by the availability of a greater number of men. Again, although we are familiar with the 'authorised establishment' of modern local authority brigades, and the statutory numbers of attendants and firemen in places of public entertainment, there are also brigades which can afford to be more lavish with manpower. The difference reminds us that in many cases a brigade is operating with the maximum number of men that can be paid for, even though a better service might result if there were more men. It is not enough to list equipment used by a brigade. We have to visualise how it was actually used. For this reason, the analysis of VI.1056, 1057 and 1058 is the first of the historical chapters in this study. The implications of Chapter 3 are brought out in more historical terms in the subsequent chapters, including the present one, but so central is the question of numbers that we do not finish exploring it until the final chapter.

4.1.4

Previous studies of the Vigiles have not faced squarely the questions of numbers and the environment of the Vigiles, and at most have offered comparisons with modern fire brigades which suggest that the Vigiles so

outnumbered modern brigades in comparable cities that they must have had other duties as well as firefighting (eg. BR, pp.15f). Thus BR does not produce a satisfactory account either of the equipment or of the operations of the Vigiles, and with this approach is led to conclude (p.98): "So much, or rather so little, for equipment."

4.2.1

Since the Vigiles had to operate without motorised equipment, and without the aid of breathing and other modern equipment, it will be helpful, first, to look briefly at an illustration of a fire in Naples as fought in the pre-industrial age, early in the nineteenth century. The original print is in the hands of the Italian Vigili del Fuoco (Fire Service), and a copy is shown in Figure 1. In order to show up the firefighting features more clearly, Figure 2 is a redrawing by an artist.

To the bottom left, a large manual pump is shown in operation, with four men on one side (and presumably the same number on the other). The objects with handles, at the bottom of the picture, are for winding hose on, very like modern hose-winders. The firemen are using hoses to take the water to the fire, and are directing jets from the ground, from ladders, and from within the burning building. Just right of centre, there is a wheeled extending ladder with a working platform about twelve feet up. Hinged ladders are being used to gain access to the balconies, and there are hook ladders between balconies and leading to the parapet. ~~Hinged ladders are also in use.~~ Rescues are being effected with a chute, kept taut by at least ten men, with a basket lowered on a pulley, by line, and by jumping sheet (held by at least fifteen men - probably twenty were

actually involved, though they are not all shown). I have not been able to ascertain the purpose of the long poles being dipped into barrels (bottom right).

4.2.2

The most striking contrast with a modern fire, apart from the difference in the equipment, is the large amount of manpower. In particular, the number of men engaged in pumping and in using rescue equipment is far greater than we see with modern equipment. Far more reliance had to be placed on manpower, simply because the equipment was less than adequate (a comment we can make with the benefit of retrospect). Within economic limits the manpower had to make up for the equipment.

The other contrast is in the expendability of manpower. We can see this most clearly in the bottom right corner of the picture, where there are men engaged in firefighting who are far closer to the fire and the collapsing building than any fire officer would allow today. There was probably less emphasis on the safety of the firemen, though officers are hardly likely to have been careless with their men's lives. Probably the development of such equipment as breathing sets and radios has made possible the greater safety of firemen today, **aided by the growth of trade unions.**

4.3.1

When they were established in A.D.6 the Vigiles probably numbered about 3,500 men, in cohorts nominally 500 strong. In A.D.205 they seem to have been doubled in size, giving a total of 7,000 men (see 3.11.3 above and 5.2.1 below).

4.3.2

In modern England, authorised establishments of full-time firemen range from 47 at Burton-upon-Trent (with 20 part-time) to 757 at Liverpool, among county boroughs, and among counties from 22 in Westmorland (with 156 part-time) to 1062 (plus 1059) in the West Riding and 1063 (plus 835) in Lancashire. London is in a range of its own, with 5274 full-time firemen (and 1 part-time). (These are the figures as at 31st December 1972, as given by H.M. Chief Inspector, 1973.)

The first permanent city fire brigade in Britain, set up in Edinburgh in 1703, consisted of 84 part-time firemen (Blackstone 1957, 62f.). In 1862 the London Fire Engine Establishment consisted of 127 full-time men, and had 50 horses, 37 pumps and 19 stations; at the same time, the Royal Society for the Protection of Life from Fire had 77 men and 4 Inspectors (Blackstone, 168). Ten years later, the London Fire Engine Establishment consisted of 398 men, and the chief officer, Captain Shaw, wanted 931 (Blackstone, 198). In June 1938, the London Fire Brigade consisted of 1982 uniformed staff (officers and men), with 163 in administration, technical, clerical and workshops (Morris 1939, 16). The special conditions of wartime brought an increase in the numbers, and the Auxiliary Fire Service in London in 1939 had 30,000 members (Blackstone, 396).

4.3.2

These figures, which probably represent the whole range of establishments in modern times, show clearly that there was something special about the Vigiles. The original number of the Vigiles is greater than any of those cited above with the exception of London, and if we take the increased figure for the Vigiles of 7,000 we find that it exceeds all those given

above except for wartime London: and that figure was for the county of London, not just the City. There would have been no way of deducing the number of the Vigiles if we did not possess the inscriptions which provide the material for Chapter 3. It is fortunate that we can start off by knowing how many men were available for Roman firefighting operations, since this information provides a framework for our investigation of their equipment and operations. If we can see how they could all have been employed solely as firemen, we do not need to ascribe police or other functions to them in order to fill out their time.

4.4.1

There is quite a wide range of firefighting equipment attested in classical antiquity, but we should not assume that the Vigiles used all of it. This point will become clear as we go through the evidence in detail, but it is probably worth emphasising it at the outset, since BR in particular is not clear, and assumes (p.96) that the list of firefighting equipment to be found in a house (Digest 33.7.12.18) is applicable to the Vigiles in its entirety. There is sufficient evidence to show both what the Vigiles are likely to have done and also what they are likely not to have done.

4.4.2

The really crucial piece of evidence for the equipment and operations of the Vigiles comes in the list of the responsibilities and powers of the praefectus vigilum in the Digest (1.15.3):

> "Sciendum est autem praefectum vigilum per totam noctem vigilare debere et coerrare calceatum cum hamis et dolabris."

The prefect (i.q. the corps) had to remain awake all night and go around wearing boots and carrying axes and buckets. This means fire patrols, throughout the night. The buckets and axes represent the basic equipment which was always to hand, and which had to suffice for firefighting first-aid. There is a basic distinction to be made between these patrols and the reinforcements which would be required if a fire got out of hand. This distinction extends to the equipment, some of it being suitable only for reinforcement, and we may further extend it to the operations, since the first firemen on the scene had to manage with such equipment as they carried with them (basically buckets and axes) and this restricted the sort of actions they could perform.

4.4.3

In addition to this passage from the Digest, the number of firemen available must be borne in mind: there were potentially up to 3,500 men available for the patrols and for firefighting (increased to 7,000). Even the Continental city fire brigades of more recent times which used fire patrols could not match these numbers. These patrols are clearly something special in the whole history of firefighting.

4.5.1

Apart from the mention of buckets and axes in the Digest (1.15.3), we do not possess anything which resembles a list of equipment used by the Vigiles. Nor is there any such list for the army in general. The one list which does exist unfortunately is not a list of all the equipment used by any particular set of firefighters, but is simply a list of equipment which may be found in private houses and which would belong to the

instrumentum (and which could not be disposed of separately).

4.5.2

This list can be shown to include items which the Vigiles are likely to have used, together with some which they are unlikely to have used, and the individual items are discussed in their turn. For convenience, the text is given below, together with the preamble which establishes the nature of the list.

"Si domus sit instrumentum legatum, videndum quid contineatur" (Dig.33.7.12.16)

"Acetum quoque, quod exstinguendi incendii causa paratur, item centones sifones perticae quoque et scalae, et formiones et spongias et amas et scopas contineri plerique et Pegasus aiunt" (Dig.33.7.12.18)

4.6.1

That the Vigiles used pumps is attested epigraphically, though there is no mention of it in any of the accounts of fires, nor are the Vigiles mentioned by any of the hydraulic writers (Hero must surely have known something of them). The epigraphic evidence consists of the name of the specialist concerned with pumps, which occurs most fully on VI.2994: "MILIT. COH. VII. VIG. SIPONAR", and also occurs on VI.1057 and 1058 and possibly on VI.3278. The name in full is 'siphonarius'. VI.3744 bore the name of the equipment ("SIFONI[bus]"), but in this case the names of the pieces of equipment provide the evidence that this inscription is relevant to the Vigiles (see Appendix II), so that we should not use this inscription as evidence for the use of pumps by the Vigiles.

4.6.2

Many modern fire engines are basically pumps, which may carry other

equipment such as ladders or their own supply of water. It is, however, somewhat misleading to equate fire pumps with fire engines, since some pumps are portable and may be carried in light vans or by two to four men, while some fire engines have other functions (e.g. Control Unit, or Emergency Tender). In earlier periods the equation of fire engine with fire pump was more apt, though the term 'engine' often meant no more than 'apparatus'. Often the only wheeled equipment was the fire pump (wheeled fire hooks seem not to have been called 'engines'). At all periods, however, there have been pumps without wheels. It is best then, in examining Roman firefighting, to avoid the use of the term 'fire engine', since this could import misleading associations and is, at best, ambiguous. One wonders whether some such confusion prompted BR (p.80) to write of "limber-gunners" in the Vigiles, as if their pumps bore some resemblance to a field gun.

We shall, therefore, look first at the evidence for ancient pumps in general, in order to establish the range of pumps available for firefighting in general and for the Vigiles in particular. Then we shall return more specifically to the question of the equipment actually used by the Vigiles.

There is both literary and archaeological evidence for the nature of ancient pumps. The surviving pumps, unfortunately, are not from dated contexts, and for the development of pumps we have to rely on the written evidence. For the dates of the writers I follow Drachmann (1963, 10-12; 1967,16), to whom is also due the greatest credit for elucidating the history of ancient pumps.

The pump was invented by Ctesibius (c.300-270 B.C.), and his pump is described by Vitruvius (10.7.1-3):

"Insequitur nunc de Ctesibiaca machina, quae in altitudinem aquam educit, monstrare. Ea sit ex aere. Cuius in radicibus modioli fiunt gemelli paulum distantes, habentes fistulas furcillae figura similiter cohaerentes, in medium catinum concurrentes. In quo catino fiant asses in superioribus naribus fistularum coagmentatione subtili conlocati, qui praeobturantes foramina narium non patiuntur quod spiritu in catinum est expressum. Supra catinum paenula ut infundibulum inversum est attemperata et per fibulam cum catino cuneo traiecto continetur, ne vis inflationis aquae eam cogat elevari. Insuper fistula, quae tuba dicitur, coagmentatione in altitudine fit erecta. Modioli autem habent infra nares inferiores fistularum asses interpositos supra foramina eorum, quae sunt in fundis. Ita de supernis in modiolis emboli masculi torno politi et oleo subacti conclusique regulis et vectibus conmoliuntur. Qui erit aer ibi cum aqua assibus obturantibus foramina cogent. Extrudent inflando pressionibus per fistularum nares aquam in catinum, quo recepiens paenula spiritu exprimit per fistulam in altitudinem, et ita ex inferiore loco castello conlocato ad saliendum aqua subministratur."

The physical aspects of this pump are clear from this description, and Figure 3 shows Drachmann's reconstruction. Basically this pump consists of a pair of cylinders with pistons, discharging into a valve chamber and thence through a single outlet. The valves are of the flap type. Drachmann (1963, 155) supposes that since the cylinders are very near to each other each piston will have been worked independently by its own lever, but it may be observed that the use of short, quick strokes would be needed in order to produce a fairly steady jet (on this aspect, see below, 4.6.8 and 9) and for this use a single lever would have been appropriate. There are no hose connections on this pump: the pump stands in a reservoir from which it draws its water as the pistons are raised, and the outlet consists simply of a nozzle.

To some extent the interpretation of Vitruvius' description of the pump has been bedevilled in the past by his notion that air played an essential part in the pumping (that is, beyond merely pushing water into the cylinders, of which he may not have been aware). Indeed, his phrase

> "e quo [catino] recipiens paenula spiritu exprimit per fistulam in altitudinem"

has largely been responsible for the supposition that the catinus was an air chamber, such as was used on pumps from the eighteenth century for steadying the pressure of the water, so that variations in pressure caused by the pistons did not make the jet pulsating. Blackstone, indeed, writes as if the air chamber had been invented by Ctesibius and then forgotten until the beginning of the eighteenth century (1957,50). However, as Drachmann points out (1963,155), for the catinus to have served as an air chamber of this sort, the outlet pipe would have had to start at the bottom of the chamber, so as to trap some air; moreover, a close study of Vitruvious' text shows that the "air" ("spiritus") operates even before the water reaches the outlet of the cylinders, so that he cannot be thinking of "air" in our sense at all.

It is true that in the water-organ (hydraulus) there is a chamber in which water pressure steadies the air pressure, and thisis described by Vitruvius (10.8), but the reverse proceedure, of using air to steady the pressure of water, was not used at all. The notion of 'spiritus' as a force for moving water probably reflects the Stoic belief in a world spirit which was responsible for such natural phenomena as storms and

currents of water (on this see Sherwin-White 1966, 310f, on Pliny Ep. 4.30.5, with further references). In order to understand the mechanics of the pump, it is best to leave these Stoic connotations on one side, and translate 'spiritus' as 'pressure', avoiding all mention of 'air'. No ancient pump had an air chamber.

It may seem a little odd that Vitruvius describes a pump that was current over two centuries before he wrote, without describing any later developments. Yet there is some evidence that there had not been any improvements to the basic design. We can see this both from considering Hero's pump, described below, and also from deducing as much as we can from Philo's account of his pump (Philo being a younger contemporary of Ctesibius).

4.6.4

Philo actually described two pumps (ed. de Vaux, pp.213-218). One of them is a concertina-like device for installing in a well, and has no relevance to firefighting (even assuming that it ever worked). The other is very much the same as Ctesibius' pump. Since it is so similar, I give just the manuscript drawing of it, which fits the text very closely (Figure 4). There are, it must be admitted, some points of difficulty, both with the text and with the drawing: in particular, it is not clear why the two cylinders are in separate reservoirs, not why the outlets feed independently into the raised tank. It looks more like a pair of single-cylinder pumps than a single pump with two cylinders. However, in its basic components (pistons, levers, valves), it is similar to Ctesibius' pump, and the description serves to confirm the implication of Vitruvius that the pump reached a fairly full stage of its development very soon after Ctesibius'

discovery of the pumping effect of a piston in a tube.

4.6.5.

Hero, who was of sufficient maturity to be making observations of the eclipse of the moon in A.D.62, and was therefore likely to be writing some time in the second half of the first century A.D., describes his pump thus (ch. XVIII):

Οἱ δὲ σίφωνες, οἷς χρῶνται εἰς τοὺς ἐμβολούς, κατασκευάζονται οὕτως.

Ἔστωσαν δύο πυξίδες χαλκαῖ κατατετορνευμέναι τὴν ἐντὸς ἐπιφάνειαν πρὸς ἐμβολέα, καθάπερ αἱ τῶν ὑδραύλεων πυξίδες, αἱ ΑΒΓΔ, ΕΖΗΘ· ἐμβολεῖς δὲ αὐταῖς ἔστωσαν ἀφρυστοὶ οἱ ΚΛ, ΜΝ· συντετέχθωσαν δὲ πρὸς ἀλλήλας αἱ πυξίδες διὰ σωλῆνος τοῦ ΞΟΔΣ. ἐκ δὲ τῶν ἐκτὸς μερῶν αἱ πυξίδες ἐντὸς τοῦ ΞΟΔΣ σωλῆνος ἐχέτωσαν δοσάρια προκείμενα, οἷα εἴρηται ἐν τοῖς ἐπάνω, τὰ Π, Ρ, ὥστε εἰς τὸ ἐκτὸς τῶν πυξιδίων ἀνοίγεσθαι μέρος. ἐχέτωσαν δὲ καὶ ἐν τοῖς πυθμέσιν αἱ πυξίδες τρήματα στρογγύλα τὰ Σ. Τ ἐπιπυραννύμενα τυμπανίοις ἐσφηκισμένοις τοῖς Υφ, Χψ, δι' ὧν περόνια διαβεβλήσθω ἐπικεκολλημένα ἢ προσκεκοινωμένα τοῖς πυθμέσι τῶν πυξιδίων τὰ Ω, Ω, ἔχοντα ἐκ τῶν ἄκρων κωλυμάτια πρὸς τὸ τὰ τυμπάνια μηκέτι ἐξέλκεσθαι ἐξ αὐτῶν. οἱ δὲ ἐμβολεῖς ἐχέτωσαν ὀρθια συμφυῆ κανόνια μέσα τὰ ς, ϛ, οἷς ἐπιζευγνύσθω κανὼν ὁ Ζ, Α κινούμενος περὶ μὲν τὸ

μέσον περὶ περόνην τὴν Δ μένουσαν, περὶ δὲ τὰ κανόνια τὰ Ζ, Η περὶ περόνας τὰς Β, Γ. τῷ δὲ ΞΟΔΖ σωλῆνι συντετρήσθω ἕτερος σωλὴν ὀρθιος ὁ Ε, Σ εἰς δίχηλον διεσχισμένος κατὰ τὸ Σ καὶ ἔχων τὰ σημεῖα, δι' ὧν ἀναπιέζει τὸ ὑγρόν, οἷα καὶ ἔμπροσθεν εἴρηται ἐν τῷ ἀναπυτίζουτι ὕδωρ ἀγγείῳ διὰ τοῦ πεπιλημένου εἰς αὐτὸ ἀέρος. ἐὰν οὖν αἱ εἰρημέναι πυξίδες σὺν τῇ πρὸς αὐτὰς κατασκευῇ ἐμβληθῶσιν εἰς ὕδατος ἀγγεῖον τὸ ΖΗΘΜ^Α καὶ κηλωνεύηται ὁ ΛΑ κανὼν ἐκ τῶν ἄκρων αὐτοῦ τῶν Λ, Α ἐναλλὰξ κινουμένων περὶ τὴν Δ περόνην, οἱ ἐμβολεῖς καθιέμενοι ἐκθλίψουσι διὰ τοῦ Ε, Σ σωλῆνος καὶ τοῦ Μ^Β ἐπιστρεπτοῦ στομίου τὸ ὑγρόν· ὁ γὰρ ΜΝ ἐμβολεὺς ἀναστειρόμενος μὲν ἀνοίγει τὸ Τ τρῆμα ἐπαιρομένου τοῦ ΧΨ τυμπανίου, ἀποκλείει δὲ τὸ Ρ ἀσσάριον· καθιέμενος δὲ τὸ μὲν Τ ἀποκλείει, τὸ δὲ Ρ ἀνοίγει, δι' οὗ καὶ τὸ ὕδωρ ἐκθλιβόμενον ἀναπιέζεται· τὰ δὲ αὐτὰ συμβαίνει καὶ περὶ τὸν ΚΛ ἐμβολέα. τὸ μὲν οὖν Μ^Β σωληνάριον ἀνανεῦον καὶ ἐπινεῦον τὸν ἐκπιτυσμὸν πρὸς τὸ δοθὲν ὕψος ποιεῖται, οὐκέτι μέντοι πρὸς τὴν δοθεῖσαν ἐπιστροφήν, εἰ μὴ ὅλον τὸ ὄργανον ἐπιστρέφεται· τοῦτο δὲ βραδὺ καὶ μοχθηρὸν πρὸς τὰς κατεπειγούσας χρείας ὑπάρχει. ἐν οὖν εὐκόπως εἰς τὸν δοθέντα τόπον ἐκπτύζηται τὸ ὑγρόν, ποιήσωμεν τὸν

Ἐς σωλῆνα σύνθετον κατὰ τὸ μῆκος ἐκ δύο συνεσμηριομένων ἀλλήλοις, ὧν ὁ μὲν εἷς συμφυὴς ἔστω τῷ ΞΟΔΖ σωλῆνι, ὁ δὲ ἕτερος τῷ διχήλῳ τῷ πρὸς τῷ Σ· ἐπιστρεφομένου γὰρ τοῦ ἐπάνω σωλῆνος καὶ ἐπινεύοντος τοῦ Β Μ ὁ ἀναπιεσμὸς γίνεται, πρὸς οὓς ἐὰν βουλώμεθα τόπον. ἕξει δὲ καὶ ὁ ἄνω συνεσμηριομένος σωλὴν κωλυμάτια πρὸς τὸ μὴ ὑπὸ τῆς τοῦ ὑγροῦ βίας ἐκπίπτειν τοῦ ὄχήματος· ταῦτα δὲ ἔσται γαμφοειδῆ συγκεκολλημένα αὐτῷ καὶ περὶ κρίκον στρεφόμενα περικείμενον τῷ ὑποκάτω σωλῆνι.

In Woodcroft's translation:

"The siphons used in conflagrations are made as follows. Take two vessels of bronze, ABCD,EFGH, (fig. 27[= my Fig.5]), having the inner surface bored in a lathe to fit a piston, (like the barrels of water-organs), KL, MN being the pistons fitted to the boxes. Let the cylinders communicate with each other by means of the tube XODF, and be provided with valves P, R, such as have been explained above [i.e. flap valves, Hero ch. XI], within the tube XODF and opening outwards from the cylinders. In the bases of the cylinders pierce circular apertures, S, T, covered with polished hemispherical

cups VQ, WY, through which insert spindles soldered to, or in some way connected with, the bases of the cylinders, and provided with shoulders at the extremities that the cups may not be forced off the spindles. To the centre of the pistons fasten the vertical rods SE, SE, and attach to these the beam A' A', working, at its centre, about the stationary pin D, and about the pins B, C, at the rods SE, SE. Let the vertical tube S'E' communicate with the tube XODF, branching into two arms at S', and provided with small pipes through which to force up water, such as were explained above in the descriptions of the machine for producing a water-jet by means of the compressed air [see below, 4.6.6]. Now, if the cylinders, provided with these additions, be plunged into a vessel containing water, IJUZ, and the beam A'A' be made to work at its extremities A'A', which move alternately about the pin D, the pistons, as they descend, will drive out the water through the tube E'S' and the revolving mouth M'. For when the piston MN ascends it opens the aperture T, as the cup WY rises, and shuts the valve R; but when it descends it shuts T and opens R, through which the water is driven and forced upwards. The action of the other piston, KL, is the same. Now the small pipe M', which waves backward and forward, ejects the water to the required height but not in the required direction, unless the whole machine be turned round; which on urgent occasions is a tedious and difficult process. In order, therefore, that the water may be ejected to the spot required, let the tube E'S' consist of two tubes, fitting closely together lengthwise, of which one must be attached to the tube XODF, and the other to the part from which the arms branch off at S'; and thus, if the upper tube be turned round, by the inclination of the mouthpiece M' the stream of water

can be forced to any spot we please. The upper joint of the double tube must be secured to the lower, to prevent its being forced from the machine by the violence of the water. This may be effected by holdfasts in the shape of the letter L, soldered to the upper tube, and sliding on a ring which encircles the lower."

Figure 5 shows the manuscript drawing of this pump, taken from Drachmann (1967, p.21 Abb.10). This drawing is consistent with the text, and shows with reasonable clarity the distinctive feature of this pump - Hero's special design of the outlet. It is suggested below that this may not be a scaled drawing, and that the relative proportions of the components of the pump cannot be deduced from it. On the other hand, his interest in the speed with which the jet can be directed seems to reveal an intimate knowledge of the practical difficulties of fire-fighting, and we are enabled to make a reasonable guess as to the size of the pump (see 4.6.10). The valves of Hero's pump are spindle valves, instead of the earlier flap valves, and this possibly represents an improvement hydraulically and in reliability. The outlet, even without Hero's rotating joint, is an improvement, since the elevation of the jet can be altered without tipping the pump. Otherwise, there is no change, and in particular there are still no hoses nor air cylinders.

4.6.6.

Hero describes another device for squirting water, of which I give just the manuscript illustration (Figure 6). This is of interest because it embodies exactly the same principle as the modern type of stored pressure fire extinguisher, in which compressed air is stored

in the extinguisher and drives out the water when the outlet is opened. In Hero's device the air pump is built in.

The outlet is made to rotate in a vertical plane, thus altering the elevation of the jet. The spherical container is said by Hero to hold in all six cotyls, or three pints. It is thus small enough to be held in the hands. It was not for ease of directing the jet that the outlet could rotate: quite simply, the need for the pipe inside the sphere to go right to the bottom of the water so that water and not air would be forced out meant that unless the jet was only required to be vertical the outlet had to be capable of moving. And so, again, in the absence of flexible hoses this special joint was used. Unlike the fire pumps, however, there was no problem in turning the whole vessel, so there was no need for Hero's special rotating joint.

Hero does not give any indication of the uses to which this device was put. There is no reason, of course, why it should not have been used in firefighting, but it should be noted that its maximum usable size is limited by the weight of the water. (The common modern red fire extinguisher contains two gallons of water.) It is not known why Hero gives the capacity as three pints: it could have been bigger. There is no other evidence for equipment resembling modern fire extinguishers. For the firefighting capacity of this sphere - if it were used in firefighting - see 4.6.11.

4.6.7.

A small piece of additional technical information comes to us from

Isidore (20.6.9):

"Sifon vas appellatum quod aquas sufflando fundat; utuntur enim hos [in] oriente. Nam ubi senserint domum ardere, currunt cum sifonibus plenis aquis et extinguunt incendia, sed et camaras expressis ad superiora aquis emundant."

The reservoir here is filled with water before the pump is brought to the fire. Clearly the amount of water must have been limited, in view of the weight to be carried.

It is possible that in some eastern cities any water had to brought, and it was most convenient to bring some with the pump. In Rome this problem did not exist, in view of the wide availability of water, and for speed the Vigiles probably carried their pumps without any water.

4.6.8.

The surviving examples of pumps are all of the same type as those described by Vitruvius and Hero. Figure 7 shows the best-preserved example, found at Bolsena and now in the British Museum. It has flap valves. Figure 8 is a sketch-section of another pump in the British Museum, also at Bolsena, less complete than the last, and fitted with spindle valves. Stored with the latter are two further fragments, shown in Figures 9 and 10. The piston (Figure 9) does not fit the pump shown in Figure 8, and since the pump in Figure 7 already has two pistons, this one must belong to a third pump. The other fragment (Figure 10) is something of a mystery, since nothing like it appears in the complete pump (Figure 7). However, a similar fragment is in the cylinder of the pump in Figure 8, so it may be part of the piston linkage. It could belong either to that pump, or to another. Another similar

pump from Castrum Novum, said to be in the Vatican Museums, cannot now be traced (referred to by Smith 1890, vol.1, p.570). For a detailed technical description of these pumps see Davis 1896. Silchester has produced a frame for a pump similar to these, made entirely of wood in one piece, but with the pump removed and other pipework substituted (Hope and Fox, 1896, 232-4). Another pump is recorded in the museum catalogue of Metz (p.XX11, where the illustration is based on Vitruvius' text, not the actual pump).

The capability of these pumps is considered below (4.6.10). Whether they were intended for firefighting can only be surmised. Their physical form is ambiguous, since on the one hand they closely resemble the pumps of the hydraulic writers, and Hero says that these pumps were used in firefighting, while on the other they do not have flanges suitable for attaching the L-clamps which Hero prescribed for his own outlet. There is one somewhat negative point which tends to suggest that most pumps of this type would have been for firefighting, and this is that whenever it was required to convey large amounts of water by other means than gravity, equipment such as water-screws, water-wheels or else bucket-chains were used. Pumps were not used unless an actual jet of water was required. Their use was thus restricted to firefighting, and to minor domestic uses such as washing high vaults (indicated by Isidore 20.6.9, quoted above at 4.6.7). There is a strong presumption that any pump was for firefighting.

4.6.9.

The ancient evidence for pumps is thus completely consistent. The pumps were single-acting force pumps, and they lacked flexible hose

connections. Although they would not have been capable of producing a steady jet (i.e. not pulsating with the strokes of the pistons), they would, with the use of short quick strokes, have been capable of producing a continuous jet; and the more skilled the operators, the steadier would the jet have been. It may be prudent to emphasise again that these pumps did not have air vessels.

It remains to clear up some points of terminology. The term 'stirrup pump' is not appropriate for these pumps, since they were not fitted with stirrups (see Figure 11 for a typical stirrup pump: in this example the foot is placed on the stirrup instead of through it). The term 'double-acting' is not appropriate, since this term is best reserved for pumps in which water passes through the piston via a non-return valve; it should not refer to a pair of single-acting pumps, such as these were. The term 'reciprocating' is acceptable, though it means little more than that pistons were used (instead, for example, of a centrifugal impeller). The term 'lift-pump' is not really suitable, since it normally implies that the pump can raise water from some level below itself, whereas these pumps had to stand actually in the water; being without hoses or pipes on the inlets, they could not work if they were above the water. Finally, it is difficult to distinguish between 'fire pumps' and other pumps, except in the design of the outlet. Any <u>siphc</u> could have worked at a fire; it is probable that most <u>siphones</u> did work at fires.

4.6.10

The firefighting capability of these pumps is the major aspect of interest to this thesis which has been neglected by previous studies. In the case of the surviving pumps we can make a good guess. With the pumps described by Philo, Vitruvius and Hero there is the difficulty that we do not know how big they were. It is probable that pumps were made larger and larger, until either the materials proved inadequate, or the number of operators became unreasonable, or the water supply became inadequate. We should, of course, beware of identifying the ideal with actuality. The argument has often been put to me that because Roman buildings were high the pumps must have been large. Yet it is quite clear from modern practice that needs are not always answered in the most obvious way: otherwise we should have extending ladders and pumps capable of reaching the top of a skyscraper. We must rely on the evidence for the pumps themselves.

The two larger of the Bolsena pumps have a bore in the cylinders of 1.5.sq.in. and a maximum possible stroke of 4 in. The maximum capacity of the two cylinders is therfore 12 cu.in. At one complete stroke per second this will give a total output of 720 cu.in., or 2.6 g.p.m. The Silchester pump seems to have had a maximum stroke of 15", in cylinders of 3" diameter. Normally it is necessary to know at least two of the factors nozzle diameter, pressure at the nozzle and nozzle velocity before the output of a pump can be calculated, but since these pumps were hand-operated there is one alternative factor which can be utilised. This is the frequency

with which human muscles can operate the pump. Two complete strokes a second should not present a great deal of difficulty with the Bolsena pump; with a great load, however, or a multiplicity of operators, there would arise problems of co-ordination. It would also be necessary, possibly, to restrict the length of the stroke in order to produce a reasonable steady jet. For these reasons it seems unlikely that more than 10 g.p.m. could be put out by the Bolsena pumps, and a more normal output would probably be in the region of 5 g.p.m. Having two cylinders the pump would produce a continuous jet, but this would have been pulsating. The pressure would be no more than in any small hand-pump. The Silchester pump cannot have been worked as fast, but its output could have been similar, but with a steadier jet.

The pumps which are described by Philo, Vitruvius and Hero could have been much bigger than those which have survived. Moreover, even if on general grounds it is possible to estimate the maximum size of pump that would have been satisfactory at the majority of fires, there would still remain the possibility of a yet larger pump which could only operate in certain areas where there was an unusually large supply of water and where the streets were wide enough to enable such a pump to be manoeuvred.

It might appear that the proportions of the pump illustrated in the manuscript of Hero (Figure 5) are those of a two-man pump. This would certainly be the case if we imagine that the cylinders are of medium size (with a diameter of a few inches) and that the

levers connecting the pistons are drawn to the same scale. However, Hero does not give dimensions, and his illustrations are usually diagrammatic. We have the unusually clear case of the organ, of which his account and the illustration show just the bare essentials whereas Vitruvius (writing earlier than Hero) describes a much more complex instrument (Vitr. De Arch. 10.8). There is another point in connection with the illustration of the pump, that if the outlet had been shown above the level of the levers there would have been a problem in drafting. As it stands, it provides a clear diagram with the hydraulic parts neatly framed within the cylinders and levers. There may thus be more than one scale in the drawing. Possibly this is not a scaled drawing at all.

Hero does, however, provide us with some indication of size, in his account of his design for the outlet of the pump. Referring, as we have seen, to the pipe M' in the diagram, he comments that turning the whole pump round to the required direction is tedious and difficult:

"... εἰ μὴ ὅλον τὸ ὄργανον ἐπιστρέφεται· τοῦτο δὲ βραδὺ καὶ μοχθηρὸν πρὸς τὰς κατεπειγούσας χρείας ὑπάρχει."

Why should turning the pump be tedious and difficult? Naturally such an action would entail a cessation of pumping, followed by a resumption to see whether the nozzle was now pointing in the right direction; several such adjustments could be necessary. But this cannot be the whole explanation, since if the pump were small and light the problem would not exist in these terms.

The heaviest part of the weight to be moved would be the water in

the reservoir. For example, a reservoir holding about 3 cu.ft. of water would weigh about 1.7 cwt. If we add on some more for the weight of the reservoir itself and of the pump we reach a total weight in the region of 2 cwt. This is not the sort of weight to cause difficulty to two men (who need not be the same men as the pumpers). Probably we should infer that he is thinking of a weight in excess of 2 cwt. It is true that we do not know whether Hero's joint found its way into firefighting use, nor do we know how far he is thinking in purely idealist terms of saving merely a few seconds (bearing in mind particularly that pumps would not have been in the first attendance at a fire). He does seem, however, to be acquainted with one of the more esoteric of a fireman's problems, and on balance it is probably best to take it that he is writing in an informed way. Once we reach weights beyond 2 cwt. we reach a different class of handling. For weights of 3 to 4 cwt. the number of men would need to be increased to 3 or 4. Thus in addition to the machine being more cumbersome there is the problem of co-ordinating the men. A reservoir measuring 4 ft x 1.5ft x 1ft will hold 3.3 cwt of water, and even allowing ample space for men to empty buckets into a larger pump than any now extant is required in order to justify having this size of reservoir at all. The larger the reservoir, the faster should be the rate of discharge and the larger the pump.

For these reasons it is plausible that pumps were used which required up to, say, six men. Whether larger pumps existed cannot be deduced from Hero, though it is perhaps worth observing that if a pump were really large (over 12 men) it would have to be on a carriage and could

only be moved by being wheeled around. Such a wheeled pump would not have been suitable for the bumpy and narrow streets of Rome and could only have operated in a few areas. Possibly there were a few such pumps.

By a similar reasoning we may suggest that Philo's pump (Figure 4) was of considerable size. The leather reservoirs for this are said to be about 2 ft in diameter and 3 ft in depth (ed. de Vaux, pp216f). The method of filling them and the amount of water which it was desired to store in them will have influenced their size; but it is difficult not to infer also some relation to the size of the pumps which they supplied. Cylinders much bigger than any of the extant ones could have fitted into the reservoirs, and conversely it would have been absurd to have such large reservoirs for the extant pumps. The description also states that there was one cylinder per reservoir, not two, and this also is consistent with a large pump. Unfortunately, some important details of the account and illustration are obscure, and for this reason we cannot press this description any further (see above, 4.6.4).

4.6.11

Thus far we have concentrated on the size of the pumps, and we are now in a position to deduce something of their firefighting effectiveness. It should be borne in mind that even today the vast majority of fires are put out with small-scale hand operated equipment, and that the occasions when a large pump is used tend to be only a minority. Modern specifications for pumps can require up to 1,000 g.p.m. at 100 lb/sq.in; the jet should be capable of reaching the fire without being

carried away by convection currents, and so should be continuous and at a steady pressure. The pump should be capable of a wide range of work, from large quantities at high pressure to small quantities at low pressure. The characteristics of the centrifugal type of pump have led to its universal adoption by fire brigades for all larger pumps. For smaller pumps, there are the portable types, carried by two to four men, which are also centrifugal, right down to the stirrup pump, which (in the form that is familiar) was developed for the special requirements of wartime firefighting and produces a continuous jet from a single piston (Figure 11). Ordinary garden syringes can be effective if the fire is small, and even a squeezy bottle filled with water can put out a fire in curtains or other hangings while creating a minimum amount of water damage. This is the sort of context in which Hero's hollow sphere would have been very useful. Its main drawback would have been the necessity to keep it upright, as this would have precluded its use for fires at a lower level than the sphere could be held (a flexible hose would have been needed for this, or else a down-turned outlet).

In order to assist our study of the Roman pumps we may divide modern pumps into three classes according to their effectiveness in fire-fighting. In practice one class merges into the next, but the advantage of this classification for us is that we do not have to try to give descriptions of pumps which are not based upon adequate data (e.g. we are totally ignorant of the nozzle diameters of Roman pumps). Instead we ask the much simpler question, to which class are the pumps likely to have belonged. These three classes are as follows:

1) small pumps: light, portable, hand-operated, may be used indoors, do not require much water, very effective at the early stages of a fire, and potentially all that is required:

2) medium pumps: portable by two men or a few more, more powerful than small pumps (output from, say, 10 g.p.m. up to 400 g.p.m.), hand-operated or motorised, useful for containing a largish fire, extinguishing a fire somewhat beyond the control of a small pump, and drenching a building:

3) large pumps: motorised, permanently mounted on a chassis (the conventional 'fire engine') or portable by four to six men, output over 500 g.p.m., capable of extinguishing large fires or controlling a conflagration, unsuitable for many small fires.

The surviving pumps will fit into the class of small pumps, while Hero's will belong to the medium class. If we accept that there may have been yet larger pumps, they will still belong to the medium class: the Romans had nothing which corresponds with the modern large pump.

For the medium pumps such as that of Hero there is some interesting comparative material in a range of pumps described by Nathaniel Hadley in an advertisement of the period 1769-1790. The first to third columns are those of Hadley, the fourth and fifth are my own estimates (it is generally agreed that the maximum effective height of a jet for firefighting is about two-thirds of the maximum or actual height of a jet).

Men	G.p.m.	Horizontal throw	Estimated maximum vertical throw for stated g.p.m.	Estimated maximum firefighting height for stated g.p.m.
1	16	12 yds.	18 ft.	12 ft.
2	30	25 yds.	37 ft.	25 ft.
4	50	33 yds.	49 ft.	33 ft.
8	70	37 yds.	55 ft.	37 ft.

There are larger pumps in the broadsheet, which need not be relevant to ancient pumps but of which the details are given below for interest and because there is a comparative lack of actual figures for manual pumps.

14	100	40 yds.	60 ft.	40 ft.
16	120	45 yds.	67 ft.	45 ft.
18	150	48 yds.	72 ft.	48 ft.
22	170	50 yds.	75 ft.	50 ft.
24	200	52 yds.	78 ft.	52 ft.

The smallest three pumps are called "Garden Engines" and were carried. The range of "Fire Engines" started with the 8-man pump, and all of these were wheeled.

4.6.12

To see what this analysis implies with regard to the majority of fires, we may refer briefly to Table 3A: Methods of Extinction of Fires in Buildings, 1961-1968 (United Kingdom Fire and Loss Statistics 1968, H.M.S.O. 1970), which gives figures that reflect the general experience. This table shows that one fire in four to which a brigade is summoned

is extinguished before the brigade arrives, and that the most common method of extinction in this class is the application of water from buckets. Among the fires which are extinguished by the brigades, the method which is successful on more occasions than all other methods put together is the use of the hosereel using only water carried in the hosereel tank. The hosereel consists of a ¾" hose fed from a tank holding around 80 gallons, and this hose is ready to be pulled off the reel as soon as the appliance stops, and can furnish around 10 gallons per minute. On the occasions when this is not enough, the hosereel tank may be filled from hydrants, or the use of one or more 2¾" hoses fed from the main pump (500 g.p.m.) or from hydrants may be required. Alternatively, on rather fewer occasions, the use of extinguishers, stirrup pumps or hand pumps may be called for. It is thus only a minority of fires which require the use of large pumps. If we also take into account all the fires to which the brigade is not summoned (possibly four times as many as those to which they are summoned), it becomes very clear that by far the vast majority of fires are extinguished by means of the simplest hand equipment: buckets of water, sand, earth, stirrup and hand pumps, and extinguishers.

The successful operation of sprinklers is similarly often on a small scale, sprinkler systems being designed so that three heads should be sufficient to control a fire, each head producing 5 to 25 g.p.m. The statistics for sprinklers are less clear than those for other methods of extinction, since often a fire is actually put out by other means even when the sprinklers have succeeded in controlling it. However, the basic point remains that in the majority of cases only a small

amount of water is required to control or extinguish the fire.

This brief look at some modern figures demonstrates the well-worn maxim, that practically any fire can be put out with ease if it is caught early enough. It also emphasises two aspects concerned with hosereels and sprinklers. The point of a hosereel is to provide an instant amount of water at a reasonable pressure which may be taken into a building by one or two men; a similar amount of water conveyed without hoses (e.g. in buckets) would demand a large amount of manpower, and, even if comparable quantities could be delivered, the pressure would not be adequate to overcome the convection currents around the fire and admit the water to the seat of the fire. Sprinklers operate automatically, and come into operation as soon as enough heat has built up to set them off. In this way they are able to operate while the fire is still in its early stages. As with the hosereel, they produce water at a sufficient pressure both to produce the required spray after hitting the deflector plate and also to overcome convection currents (water dripping from ceiling height under gravity only might well fail to reach the fire). There are thus three points which should be satisfied when a method of extinction is adopted: detection must be rapid; water must be readily available in adequate (though not necessarily large) quantities; and it is preferable for the water to be applied with some pressure. For fires above the head of the firemen, for example, in ceilings, it is essential to have to apply the water under pressure, otherwise it will not arrive.

Returning now to the pumps used by the Vigiles, we have seen that there is good reason to suppose that they could have been operated by up to

six men or thereabouts (and they might have been bigger still, though there is no evidence for this). They would thus have been more than adequate for the majority of fires. In fact, the system of patrols was largely designed to avoid the need to use anything more than buckets of water. On the occasions when pumps would have been used, the lack of hoses would have restricted their usefulness considerably. They could have been useful when operated near to the fire, and they would have been essential for fighting fires in roofs and ceilings. However, as Braidwood observed (1830, 4):

> "I do not approve of small engines [i.e. pumps] for the service of large towns. Much has been said about the convenience of conveying them up stairs, and into places where the fire is raging; but I fear that those who have so strongly recommended them, have seldom made the experiment."

He explained that at the only stage of a fire at which small pumps might be of use, there is too much smoke, and also it is inconvenient to convey water into an appartment while the occupants are removing their property. He concludes:

> "I have no doubt that small engines may, in particular instances, have been useful; but I apprehend most of these cases might have been as well provided against, by a few well-applied buckets of water."

4.6.13

Thus although their output in gallons per minute may have been greater than that of the modern hosereel, the lack of hoses made the ancient pumps very inferior in their range of application. Pumps as small as the surviving ones could have been useful on fires in ceilings or partitions, and we should not rule out the possibility that one or two pumps were taken out with the patrols for this type of fire; provided that they

could be brought into operation quickly enough, they could have been successful in controlling or extinguishing such fires. Larger pumps must have been a reinforcement, and, to the extent that by the time these were brought into operation the fires had become bigger, such larger pumps may well have had a lower rate of success.

4.6.14

The crucial question which remains is therefore how quickly the Vigiles could detect fires and start to extinguish them. The higher the standard of training, discipline and morale, the greater the success they will have achieved with the pumps. This question is one of the main themes of this thesis, and the answer is given in Chapter 8. So far as the pumps themselves are concerned, they were adequate if they were applied soon enough to a fire. They had deficiencies in comparison with modern pumps: but they were backed up by a much larger number of firemen per acre than any other brigade. It was the availability and deployment of such a large number of men which made up for deficiencies in the equipment. The pumps were as successful as the patrols.

4.7.1

One of the two types of equipment which the patrols were required to carry was buckets (Dig.1.15.3). Although there is no archaeological evidence of direct relevance to fire-buckets in Rome, this does not matter much as far as the effect on firefighting is concerned. What is important is the extent to which buckets were used.

4.7.2

It is probable that they sufficed for the vast majority of fires, just as buckets and other small-scale hand equipment suffice for the vast

majority of fires of the present day. In the absence of hoses (see below 4.8), they will also have served for conveying water to the pumps when these were used, supplemented at large fires by water carts and possibly the services of the aquarii. A bucket-chain which is working well should be capable of delivering at 120 g.p.m. to start with, and over a long period should average over 40 g.p.m. This estimate assumes that the men are approximately 2 metres (6 feet) apart, with a supplementary chain for returning the empty buckets.

A multitude of bucket-men provided one of the more striking sights at the big fire in A.D.192 (Dio 73.24.1):

"παμπόλλων μὲν ἰδιωτῶν παμπόλλων δὲ στρατιωτῶν ὑδροφορούντων"

The only fire at which buckets are recorded to have been effective in providing a large amount of water was the one in A.D.217, in which the Colosseum suffered severe damage from water, both applied by men and also falling as rain (Dio 79.25.2):

"οὐδὲ ἐπαρκέσαι αὐτῷ οὔτε ἀνθρωπίνη ἐπικουρία, καίπερ παντὸς ὡς εἰπεῖν ὕδατος ῥέοντος, οὔθ' ἡ τοῦ οὐρανίου ἐπίῤῥοια πλείστη τε καὶ σφοδρατάτη γενομένη ἠδυνήθη. οὕτω που καὶ τὸ ὕδωρ ἑκάτερον ὑπὸ τῆς τῶν σκηπτῶν δυνάμεως ἀνηλίσκετο, καὶ ἐν μέρει καὶ αὐτὸ τοῦτο προσεσίνετο."

It is unlikely that the phrase "παντὸς ... ὕδατος ῥέοντος" means that the aqueducts were cut to enable the water to flow along the streets to the fire, since this technique, which worked well in medieval cities, would have been unsuccessful in Rome owing to the various drains and channels beneath the streets. Probably it refers to the diversion of

water in the aqueducts to concentrate it in the vicinity of the fire (cf. Frontinus Aqu.2,117 and 2,87 for the facilities for diverting water as needed).

4.7.3

The nickname 'sparteoli' which was applied to the Vigiles seems to have alluded to their buckets. The word occurs in two passages:

"Sparteolorum Romae, quorum cohortes in tutelam urbis cum hamis et cum aqua vigilias curare consueverunt vicis" (Schol.Juv.Sat.14.305)

"ad fumum coenae Serapicae sparteoli excitabuntur" (Tertullian, Apol.39)

Analogy with later firefighting equipment led Kellermann (1835,p.2.n.6) to suppose that this nickname referred to the buckets, the buckets of his own day being made of esparto grass coated with pitch. He did not, however, discuss the passage in Pliny (N.H. 19.2f) where the uses of esparto grass are described, and in which there is no mention of buckets. Pliny observed that esparto produced ropes which were easy to repair and were good both in wet and in dry uses. As such, it could easily have found widespread use in firefighting. It does not, however, follow from this that 'sparteoli' would have been more likely to refer to ropes than buckets.

The modern description of the Vigiles as a "bucket brigade" is not relevant here, since it has reference to other types of brigade less dependent on buckets, and no such comparison existed in the Roman period. On the other hand, the satirists regarded buckets as a distinctive feature of firefighting. Thus Juvenal describes the millionaire Licinus with his fire-watching slaves and buckets (Sat.14.303-8):

"Tantis parta malis cura maiore metuque

servantur: misera est magni custodia census.
dispositis praedives amis vigilare cohortem
servorum noctu Licinus iubet, attonitus pro
electro signisque suis Phrygiaque columna
atque ebore et lata testudine."

Petronius also implies the use of buckets when he writes of the Vigiles who

"effregerunt ianuam subito et cum aqua securibusque tumultuari suo iure coeperunt" (Sat.78)

And the patrols of the Vigiles must have been unusual since they carried buckets. In contrast, ropes will not have been used extensively at the majority of fires (see 4.17), while for rescues we should note the evidence of Juvenal (Sat.3.190-210), that the unfortunate Codrus had no alternative but to wait for his death ("ultimus ardebit", line 201). Buckets were the only prominent and distinctive feature of Roman fire-fighting, and for this reason we should retain Kellermann's suggestion that 'sparteoli' referred to buckets.

4.8.1

In the absence of any evidence for hoses, it is perhaps worth emphasising that there is positive evidence that hoses were not used. It has frequently been put to me in discussion that it would have been easy for the Romans to make hoses, and that their use by the Vigiles may therefore be taken for granted. Also BR (p.89) refers to Domaszewski's "Spritzen-männer" = "hose-men" in discussing the sifonarii, and endorses this interpretation as well as his own interpretation ("the 'Limber-gunners' whose duty it was to keep the engine clean"). This is despite the fact that elsewhere (pp.94f) he recognises that the pumps stood in their own reservoirs. Possibly he inferred that although there were no suction

(input) hoses there were output hoses. However, the sifonarii are better taken to be the technicians concerned with the pumps per se, that being sufficient to explain their title. The term 'sifonarius' does not of itself imply hoses. Lightfoot's translation of Pionius' Life of Polycarp refers to hoses (Lightfoot 1885,1063):

"So the hose and water and every contrivance of art was brought".

This is, however, a mistranslation, since the Greek actually refers to siphones, water and every device (Lightfoot p.1042):

"ἐφέροντο οὖν οἱ σίφωνες καὶ ὕδωρ καὶ πᾶσα τέχνης ἐπίνοια"

We may also note that the ability to deliver large quantities of water does not necessarily require the use of hoses, and that there is no reason why the extensive water damage to the Colosseum in the fire of A.D.217 could not have been caused by buckets and the rain (Dio 79.25,2; above,4.7.2). Finally, on the negative side, it had been put to me that Caesar took precautions against the use of hoses when he built a musculus at the famous siege of Marseilles (Caesar B.C.2.10):

"Super lateres coria inducuntur, ne canalibus aqua immissa lateres diluere posset"

This use of water implies the ability to squirt water at a fair pressure, but not merely would it be possible to use a rigid pipe for this, a flexible hose would be most unsuitable since it would hang down or jump about. Even if we recognise the need for the pump and its operators to be protected from missiles, we still do not need to assume the use of a flexible pipe: a lead pipe bent round corners and over a parapet would work perfectly well. And, assuming that the water could be played on the roof before the mortar had a chance to set, all that would be needed would be a cascade of water over the face of the tiles. Caesar himself seems

not to have had hoses available, since at Brindisium he resorted to the construction of towers two storeys high on every fourth raft to assist with firefighting ("quo commodius ab impetu navium incendiisque defenderet"), a precaution which would have been redundant if he could have used hoses (Caesar B.C.1.25).

4.8.2

The one piece of positive evidence that hoses did not exist is in Hero's description of his new design for the outlet of the pump (see 4.6.5 and 10). If hoses had existed, there would not have been a problem over directing the jet of water.

4.8.3

It remains a hypothetical possibility that hoses were invented subsequently, but there is no evidence for this while we do know that the pump which Hero describes is the most advanced of the ancient pumps. There is more to making a fire hose than is apparent at first sight. As well as being capable of withstanding high pressures and sudden pressure shocks (e.g. those caused by the pistons in the pump), they have to be light, easy to handle, and easy to couple and uncouple. The first hoses to be used in modern times were made of leather, rivetted along the seam, and they were very stiff and heavy; they came in short lengths, and took a long time to lay out. They were better than nothing in certain circumstances, but then as now the majority of fires were put out without using hoses at all. Suction hoses are more of a technical problem than output hoses, since they must not collapse under a vacuum, and the descriptions of large numbers of men carrying water as late as the third century (e.g. in 217, see above, 4.7.2) mean that suction hoses were not in use. Thus the output of the

pumps must have been limited to the amount of water that could be carried, even though the pumps could raise it higher than it could be thrown, and it might have been expected that if output hoses had existed they would have been used to raise the water from ground level to the reservoirs of pumps placed in the upper storeys of the Colosseum. This seems not to have been done at the fire in 217. There seems to have been no advance after Hero. The Vigiles must have used thousands of buckets.

4.9.1

The Digest (1.15.3) says that the praefectus vigilum (i.e. the corps) had to carry axes with him on patrols, and these axes were dolabrae. The vigiles in Petronius (Sat.78) were equipped with secures. Either type could be useful in firefighting, though it is possible that the Digest is sufficiently precise to be indicating the standard issue in the Vigiles. Certainly the type of dolabra with the bent spike is useful for breaking down doors, as White observed (1967,63), though an axe with a flat back can be used as a hammer. Possibly, of course, the Vigiles used both types. Figure 12 shows a dolabra, Figure 13 a securis. For comparison, Figure 14 shows the axe in service with Braidwood's brigade in Edinburgh, and Figure 15 shows the current British fireman's axe having a wooden handle.

With axes, as with all equipment, full exploitation depended very much on the individual firemen. It is perhaps worth noting that, in addition to their uses for demolition, breaking in, and so forth, axes can often be used constructively, as hammers, for sticking in for standing on, and for attaching lines for rescue work. It is perhaps some confirmation that the Vigiles tended to use dolabrae that on Trajan's Column the troops tend to

use dolabræ in preference to any other type of axe (cf. also frequent references to dolabrae, e.g. Livy 21.11, Tac.Hist.3.20; Vegetius de re mil. 2.25).

4.10.1

The uncus or uncinus is dismissed briefly by BR, who does not distinguish it clearly from the falx (pp.98 and 89f):

"and there are also the falx of the falciarius, and the uncus or uncinus of the uncinarius"

"If the interpretation [of UNC COH] is right, they were probably equipped with hooks for pulling down tottering walls, or with climbing irons.[1]

[1]Cf.Schol.ad Iul. Ant. in Const. xxiii.88: ferramenta per quae possint de pariete in parietem transire, et ita incendium extinguere.

... this [Falciarius] would be a man equipped with a Falx, and his function would be much the same as that of the Uncinarius."

(N.B. The correct reference to the scholiast is 'schol. Juliani antecessoris in Const. xxiii.88': Du Fresne and Du Cange, s.v. MATRICARII.)

The basic evidence for these men and their equipment consists of abbreviated names, as follows:

VNC	V1.1057.7.[2]
VNC. COh	V1.1058.7.[15] and [16]
V	V1.1055.3.[14] (assuming that this is the same post)
VNC	V1.3744 = 31075
FALC	V1.3744 = 31075

V1.3744 is of interest for several reasons, and is discussed more fully in Appendix II. For the purposes of this present section it is enough to note that sufficient survives in the lines above "FALC" to show that tools and not men are referred to ('SIFONI[bus]'), and that the consular date for

this inscription is that of A.D. 362. There is no way of knowing whether VNC is an abbreviation of 'uncus' and 'uncarius' or of 'uncinus' and 'uncinarius'; 'uncinarius' seems to have become established in modern usage, but both forms are possible.

The falx is attested only in the fourth century (for its relevance to the Vigiles, see below, 4.11.1). The fact that the unc(in)us and the falx appear together on VI.3744 should imply that they were different (not observed by BR). Moreover, the actual words imply different types of tool.

4.10.2

In Latin usage the words uncus and falx are not interchangeable. Uncus means a curved or angled hook used for sticking into things. For example Valerius Flaccus (2.428) uses uncus to mean 'anchor'; uncus was commonly used of the hook by which the bodies of criminals were dragged from the prison to the Tiber (e.g. Juvenal Sat.10.66); Livy describes harpagones as "asseres ferreo unco praefixi" (30.10.16); and he also describes the use of an uncus for sticking in the enemy's ships in order to drag them along, chains being fitted for this purpose (30.10.17-20). Several hooks were combined to make the ferrea manus, which was normally thrown at the end of a chain (e.g. Q.Curtius Hist.Alex.4.2.12; Caesar B.C.1.57; Diodorus (17.44.4); an uncus would have had only one point.

The best account of falces is that of White (1967, 71-103 and Appendix E), together with PW. VI (1909) s.v. FALX (Liebenam). Although falces took many forms, their essential characteristic was a curved blade with a cutting edge on the concave edge. The ancient sources indicate twelve types in agricultural use, and there was in addition the falx muralis which was used in warfare (and of which there does not seem to be a good modern account).

We have therefore to be cautious in using the English word 'hook', since it includes the meaning of *uncus* but also includes some of the meanings of *falx* (as in 'bill-hook', 'pruning-hook'). In the field of firefighting the two senses must be distinguished.

4.10.3

Having said that the *uncus* and the *falx* should be distinguished from each other, we how have to face the problem of what each of these pieces of equipment actually did. Since there is not any strong reason to discuss them together, the remainder of this section will consider the *uncus*, and the next section will consider the *falx*.

4.10.4

Of the four possibilities for the *uncus* (or *uncinus*), two can be rejected with a fair amount of confidence. First, it is unlikely that the *uncus* was a throwing hook, like a grappling iron, since the *ferrea manus* would have been more able to find a hold than a single hook, and the term '*uncus*' would have been inappropriate. Secondly, it is unlikely that the *unci* of the *Vigiles* resembled the large fire hooks of later medieval firefighting, of which Blackstone (1957,11) gives the following account:

> "The strong crook of iron with its wooden handle, chains and cords was to be a feature of British fire fighting for many years. Its purpose was to drag off the burning thatch and to hook into the gables or other members and pull down the house to make a fire break .... They are of great size, some thirty feet long and ten inches diameter in the staff, and horses were sometimes harnessed to them to pull down a building. Some houses were built with a strong iron ring let into the gable into which the fire hook could be inserted."

Figure 16 shows a wheeled example of a large fire hook. Such hooks would have been too cumbersome to manoeuvre round the streets of ancient Rome;

their effectiveness in demolishing buildings of brick and concrete must be in doubt; and the height of the Roman buildings would have put the operators of any such hook in great danger when the buildings collapsed. In contrast with Britain, where it was one of the regular provisions of local regulations that fire hooks should be provided, the Roman world seems not to have used them: it is possible that if they had been at all common, Pliny would have referred to them in his correspondence about fire precautions in Nicomedia (Ep.10.33), though this argument cannot be pressed very far.

4.10.5

The two possibilities which cannot be rejected with confidence are more difficult, and the discussion which follows should be read with the same caution with which it is offered.

First, the scholiast on Julian refers to "ferramenta" for climbing from wall to wall (quoted above, though BR gives him the wrong name). Such implements will have been, in all probability, some sort of ladder, and if they were as useful and versatile as any modern equipment, they are likely to have resembled the modern hook ladder. Figure 17 shows one of these in use at a window; they can be used for ascending from window to window, the fireman lifting the ladder up each time he reaches a window sill; they can be used in a similar way for getting over balconies or parapets; and, although hook ladders are by no means completely safe to use as they tend to whip round and fall off, they have been used for such exploits as getting over overhanging balconies. The British type of hook ladder has two strings and one hook, as in the illustration; Continental versions sometimes have two hooks, one on each string, or

sometimes consist of one string (in the middle, the rungs sticking out on either side) with a single hook at the top.

Secondly, there is a possibility that the uncus was a smallish hook resembling the modern ceiling hook or preventer, of which a present standard pattern is shown in Figure 18. The precise form of the type illustrated was developed for pricking lath and plaster ceilings to let water out and for cutting them away in order to see whether any fire remained among the joists. Small hooks like this are extremely versatile, being extensions to the fireman's own hand and arm, and capable of a wide range of uses:- pushing, pulling, clearing, demolishing, cutting, reaching. They have been common throughout medieval and modern firefighting in Britain and elsewhere. The Roman army, too, used implements of this sort, as attested by examples which survive (minus their wooden handles). Some examples are shown in Figure 19.

Before we attempt to choose between these two possibilities, we must note that the argument from typology alone may be misleading and ambiguous. There are various similar-looking implements of which the use would be difficult to infer from the form alone. Figure 20 shows an Indian hook, dating probably to the eighteenth century used by mahouts for controlling elephants (by pulling their ears and pushing their heads). Boat hooks and well hooks (for fishing out lost articles) are similar in form (not illustrated Figure 21 is not properly a hook at all, but is a Japanese hooked spear (hoko), possibly more aptly described as like a falx with a spike; there is a cutting edge on the curved spur. Figure 22 shows a grab hook, used by air force fire brigades for breaking into aircraft (developed for canvas and light wood panels). The form is thus ambiguous. Turning the argument round, Figure 23 shows a Japanese tool which is said to have

been a thatch hook (Knutsen, 1963. 47). This identification is open to a certain amount of doubt, since the tool very closely resembles the two-pronged spear used by the law enforcement officers, the spiked studs serving to catch hold of the loose Japanese clothing. However, the point has been made, and not positively refuted, that this was a thatch hook. In this case, its use may have been different from the west European varieties, and it might have been applied to the roof from the underside. So far as this argument can be taken, it shows that not all thatch hooks need be of the same pattern, and, by extension, that not all fire hooks need be of the same pattern. The fact that the identification of this implement is itself open to doubt is itself a further emphasis that we must be very cautious in applying typology.

4.10.7

The question which faces us is whether the Romas army used hooks like those shown in Figure 19 for firefighting. There is no evidence in this connection other than their form and the known preparedness of the army for firefighting (on this see also 7.9.5 & 7). Such hooks could also of course, have been used for pulling people off battlements and siege engines if their handles were long enough. They could also have served as well hooks or boat hooks. In view of the amount of firefighting in which the army must have engaged (both in wars and also in peacetime with the many accidental fires which must have plagued their camps and forts), it is reasonable to suppose that these hocks were provided primarily for firefighting. All the surviving examples of these hooks which are known to me are from military sites, (though note Manning's caution as to 'Roman' or 'native' in the case of the Brampton hook) and, few though they are,this may be some confirmation that the army was better

prepared for firefighting than the civilian population. (See 7.9.3 for the army assisting in civilian firefighting.)

If it be accepted that such hooks were used for military firefighting, it tends to weight the interpretation of uncus in this direction. There could thus have been some borrowing from the army by the Vigiles. Possibly, also, the term 'uncus' is more appropriate for an implement consisting primarily of a hook, whereas the hook ladder (if such existed) would have attracted the name by synecdoche. The only direct evidence for the "ferramenta" for climbing with does not, if must be observed, refer to the Vigiles, but to the later matricarii (see Appendix II).

4.10.8.

My own guess is that the Vigiles will have had more pressing needs to attend to than to try to climb up the outsides of buildings: they will surely have concentrated on forming instant bucket chains, and rescuing those inhabitants who could be got out most quickly. To anticipate a later section (4.13), it is probable that if hook ladders were used, it was not in sufficient numbers to justify a specialist named after them. In contrast, many of the firemen actually at the fire (as opposed to conveying water) will often have had good occasion to use smallish fire hooks. Indeed, one job which the modern fireman can use a jet of water from a hose for, knocking down loose pieces of ceiling before he enters a room, could only have been performed by the Vigiles with some sort of hook.

4.10.9

On balance, then - and there is very little to tip the scales one way rather than the other, my feeling is that the uncus or uncinus was a smallish type of fire hook, like the modern ceiling hook. It was thus not a specialised tool;

any fireman could have used it, just as any fireman could have used an axe. In a later section we consider why there was the specialist concerned with unci or uncini, the unc(in)arius.

4.11.1

We have already looked briefly at the evidence for falces in service with the Vigiles, and have seen that the falx was different from the uncus. The sole mention of the falx in firefighting is on VI.3744=31075, which is datable to A.D.362 and which records a celebration involving the use of pumps, hooks and falces. The mention of the pumps and the hooks is our clue that firefighting equipment is involved, though it should be noted that this inscription does not actually show that the Vigiles themselves were involved, nor, despite BR (P.90), does it mention specialists concerned with the equipment. This inscription is discussed further in Appendix II. In particular, this inscription does not prove that the Vigiles still functioned in A.D.362.

If we did believe that VI.3744 gave the names of technicians or officers in the Vigiles, we should have to try to explain why one of them - the falcarius - was not attested earlier. However, once it is recognised that equipment is attested, the problem is diminished. Indeed, to the same extent that the mention of the siphones and the unci provides a connection with firefighting, so the appearance of the falces in this context provides evidence for the use of falces in firefighting. This implies that the Vigiles are likely to have used falces, even though they did not have a falcarius.

Reference may be made to the discussions of falces noted in section 4.10.2 for the basic evidence and full range of types of falx. In this present section, we need to note just two types.

4.11.2

First, the ordinary sickle probably played an important part in firefighting in Rome, in view of the large open spaces and the tendency of the vegetation to become dry in summer.

4.11.3

Secondly, the falx such as the army used for demolition would have been of great value at fires in buildings. Military writers describe their uses thus:

"asseribus falcatis detergebat pinnas" (Livy 38.5.3)

"una erat magno usui res praeparata a nostris, falces praeacutae insertae adfixaeque longuriis, non absimili forma muralium falcium. His cum funes, qui antemnas ad malos destinabent, conprehensi adductique erant, navigio remis incitato praerumpebantur" (Caesar B.G.3.14)

"falcibus vallum ac loricam rescindunt" (Caesar B.G.7.86)

The Greek name for the falx is "δορυδρέπανον". This is in itself descriptive, but in addition Appian clearly describes the construction (B.C.5.119):

"ὡς δρέπανα δόρασι περιθέσθαι".

White (1967) shows the wide range of falces available to the Vigiles. They range from the simple curved blade to the highly complex vine dresser's knife, with its six distinctive edges or spikes. There is no reason to suppose that the Vigiles adopted one type of falx as standard. They probably used several types, including the versatile falx arboraria with its cutting edge and hook on the back of the blades (see my Figure 24). They would have been useful for demolishing roofs and timber structures and tearing down large hangings.

Any fireman could have used a falx. It is interesting that the siphon and the uncus merited their own specialists, while the falx did not. For a discussion of this point please see section 4.2.4.

4.12.1

The evidence for the use of ballistae by the Vigiles is adequate to establish the fact, though it falls far short of establishing all the details which it would be desirable to know. Suetonius (Nero 38) refers to the use of ballistae at the fire in A.D.64 though without actually naming them (see below), and the abbreviated titles OP.B (VI.1057.4.[6]), OPT B (1057.7.[1]), and OP BA (1058.4[4]) are most plausibly expanded to read optio ballistarum or optio ballistae. Similarly, the B [... on VI.3744 = 31075 of A.D.362 (see Appendix II) should probably be expanded ballistis, since the inscription refers to firefighting equipment. (The A BAL may also have been concerned with ballistae.)

4.12.2

Such as it is, then, the evidence for ballistae and optiones ballistarum in the Vigiles belongs to the third and fourth centuries, by which time ballistae were of two types: stone-throwers or arrow-firers (the former being obsolete in the fourth century according to Marsden 1969, 189). In A.D. 64 the question is not which type of ballista was in use (at this stage the arrow-firer had not been invented: Marsden p.189), but whether the Vigiles were themselves equipped with them. The use of ballistae is indicated in the following passage (Suetonius Nero 38):

"horrea ... ut bellicis machinis labefacta ... quod saxeo muro constructa erant"

For my interpretation of this whole passage and for comments on the quality of the firefighting in 64 see below, 7.3.5. For the purposes

of this section we should note that in the first century these machines could only have been ballistae of the stone-throwing type. It would have been quite possible for the Vigiles to borrow these machines with operators from the Praetorians (cf. Marsden, pp. 185 and 194f). The later evidence suggests that the Vigiles acquired their own. By the fourth century, the stone-throwing type of ballista had generally been superseded by the onager (Marsden p.189), which is not attested in the Vigiles at all. The Vigiles seem not to have replaced their ballistae with onagri; there is no evidence for any other sort of artillery in the Vigiles.

4.12.3

BR (83 and 94) does not see why the Vigiles should have been equipped with ballistae, though he thought (p.97) that they might have been used for launching fire grenades (on the non-existence of which cf. 4.21.10). Domaszewski (1908 p.10) suggested that they were for demolishing dangerous walls. Marsden (1969,194), without arguing the point, favoured "the view that, whichever type of artillery they possessed [i.e. stone-throwers or arrow-firers], the Vigiles employed it for police work".

Yet there is not a real problem connected with the employment of ballistae in firefighting. The brief passage of Suetonius is sufficient to demonstrate this. Gunpowder had not yet been invented, and how else could stone and other solid walls have been demolished speedily and from a distance? Probably the suggestion that they were for demolishing tottering walls is a little too precise; the major use would have been for creating fire breaks, as Suetonius describes. For the extent to which ballistae are likely to have been used in the course of firefighting, see sections 4.12.6 & 7 below on the value of demolition.

4.12.4

Marsden (192) suggests that a team of about 10 or 11 men would comfortably have operated one ballista. Despite the appearance of just two optiones ballistae or ballistarum on VI.1057 (Marsden finds three, p.193), Marsden supposes that the Vigiles had one ballista in each century (possibly by analogy with the legions). However, since the ballistae formed part of the reinforcements and were not carried round by the patrols (which corresponded to our 'first attendance'), they are more likely to have been allotted to the cohort itself and to have been taken to a fire and operated by the stand-by centuries. Since they were not a first line of defence against fire, we cannot calculate how many will have been needed. But in view of manpower needs elsewhere, it is unlikely that more than the equivalent of one century could be spared for operating ballistae; and one century could operate 8 ballistae before A.D.205 and 16 after that date. As long as the patrols worked effectively, there would have been little use for the ballistae. On the other hand, once a fire got out of hand and started to spread, the Vigiles would have had to rely on the ballistae more than on any of their other equipment.

4.12.5

The purpose of demolishing buildings is to create a fire break, and this will normally not be done unless it is certain that a fire cannot be extinguished and that the only hope is to contain it and let it burn itself out. The fire of A.D.64 is the only occasion on which we know the Romans used this technique, though the falx and the uncus probably helped with demolition. Is demolition likely to have been used as a regular technique by the Romans?

Fire can spread in three ways: convection, radiation and conduction. "At large fires, convection and radiation probably produce the greatest fire spread, but conduction is often a contributory cause" (Manual 6a, p.65). The effect of convection causing smoke and heat to rise is well known. What is less well known is that burning materials can themselves be carried by convection (Manual 6a, p.67):

> "Flying brands are the result of convection and direct burning. The uprush of heated air above the fire carries small pieces of flaming material sometimes to a great height, and any wind there can drive them a considerable distance. Such brands alighting on combustible material will ignite it."

This is how the first Great Fire of London, in 1212, leapt the River Thames. The fire broke out in Southwark, south of the Thames, and flaming brands set light to houses on the north side of London Bridge. Those who had gathered on the bridge to watch the fire could not escape, and were either burned or drowned, to a total of 3,000 fatalities (Blackstone 1957, 11). It is probable that this convection effect was ultimately responsible for the story in Dio (55.29.8), according to which crows flew down and removed burning meat from the altar where it was being sacrificed, and then dropped it on the Hut of Romulus, setting it alight. The burning material could easily have been carried by convection currents; the presence of the crows (which is not in itself implausible)probably lent a superstitious atmosphere to the story. More recently, the fire storms of World War Two were a deliberate exploitation of the effect. It is evident that a fire break will be an unreliable method of stopping a fire which has created strong convection currents.

On the other hand, a fire break will be more use against the spread of fire by radiation (Manual 6a, 64):

> "Radiation is a potent cause of fire spread when it has attained any magnitude, and is a frequent cause of a serious fire 'jumping' from one side of a street to the other. The intensity of radiation diminishes rapidly with distance, so that an open space of sufficient width is the most effective type of fire brake [sic]."

Nowadays buildings in danger from radiation will normally be cooled either by drenchers (a system rather like sprinklers but with the water applied over the outer face of the building) or by water sprays. Clearly these methods will sometimes create great demands on the water supply, and the use of water sprays will require the use of powerful pumps. Both of these disadvantages will have hit the Romans more seriously than they hit us today, and demolition would thus appear at first sight to have been a more suitable technique for them.

Demolition does carry its own limitations, however. One - which in most societies is the major one - is that a man's house might be demolished needlessly as it turns out; and thus there might well be battles between the authorities and the householders before any demolition could take place. There could be special provision in the law to enable firemen to carry out demolitions in the face of opposition (e.g. the death penalty in the city of Stockholm for those who obstructed demolition), though no such provision is found in Roman law. In this case, however, the authority of the emperor and their military discipline could have given the Vigiles the advantage.

But there are also technical limitations. First, if it takes a long time to create a fire break the fire will overtake the line of the proposed fire break. Secondly, the resultant debris must be removed, since a building lying in a heap in situ will probably burn even better that when it was standing.

Blackstone's account of the second Great Fire of London, that of 1666, brings out these technical limitations clearly (pp.44ff, based largely on Pepys' Diary):

> "Demolition was started, but too late; again the flames reached the resultant debris before it was cleared and soon the north side of [Cheapside] was involved...
>
> The use of gunpowder for clearing fire-breaks had been recommended on Sunday by a small naval party who had been called in, but the advice was disregarded on the grounds that it was too dangerous and might cause fire in the houses blown up. Now with more than half the City involved, dockyardsmen from Woolwich and Deptford were called in and a larger party of sailors arrived with permission to use powder. Pepys saw to it that they were put to work on the east side of the fire, ostensibly to protect the Tower but perhaps with the Admiralty office and his own house in Seething Lane in view. They started demolition on the north side of Tower Street, placing a barrel full of powder in each house and igniting them by a train. The explosion lifted and broke the timber frame so that the building collapsed; then, handy with chain and rope, the seamen dragged the debris up the side streets and away from the advancing flames.
>
> Here the fire was stopped..."

Pepys' entry in his Diary for Wednesday, 5th September, 1666, reads as follows:

> "Back to the fire and there find greater hopes than I expected. By the blowing up of houses and the great help by the workmen out of the King's yards there is good stop given to it, as well at the Mark Lane end as ours."

4.12.6

Without the gunpowder the demolition would have been too slow, and without the aid of the workmen the demolished buildings could not have been removed in time. This throws considerable light on which was possible in

Rome. We can take it that the Vigiles would have been capable of dragging away any debris which they created, but it is less certain that they could have demolished the buildings speedily. Col. Gordon's experience of destroying Wazir huts is relevant here (described in Appendix IV). Although many of the buildings in Rome were of timber and at all periods there are references to the collapses of buildings, it should be borne in mind that as time went on - and particularly from the second half of the first century A.D. - an increasing proportion of the buildings were built of brick and concrete, and these would have been very difficult to demolish with the equipment available. In addition, demolition would have been a considerable drain on manpower, and it is probable that the first priority would have been given to trying to extinguish the fire with water. It is, indeed, significant that the only time when we hear of the use of demolition, in A.D.64, is when the fire was obviously inextinguishable and in this case use was made of ballistae.

4.12.7

It would seem, then, that demolition would not have been a primary technique in Rome, and it was probably confined, in the majority of fires, to small-scale removal of burning material. This was near to the limit of the tools available. The choice which faced the Vigiles was worse than that faced in later times. After the invention of gunpowder there was a good alternative to trying to extinguish the fire with water; and, around the end of the seventeenth century, the development of more powerful pumps provided a good alternative to gunpowder. The Vigiles had three possible courses open to them: relying on potentially inadequate pumps, risking the waste of their resources in demolitions, and catching fires while they were still small and so avoiding the need to use either of the two alternatives. This last course was the purpose of the patrols. Their importance cannot be exaggerated.

4.13.1

We do not hear of the Vigiles using ladders, though BR is undoubtedly right to presume that they will have used ladders (p.96). Indirect confirmation is found in the Digest, which includes ladders in the list of domestic firefighting equipment (33.7.12.18).

4.13.2

It is uncertain whether these ladders would have been hinged or extending. The only illustrations of ladders in use with the Roman army, on Trajan's Column, show simple ladders, without hinges and not extending (Cichorious 1896-1900, Taff. LXXXIII,301; LXXXIV, 302). A hinged fly-ladder is incorporated in the sambuca as described by Biton (see next paragraph). Another possible type of ladder was the hook ladder, discussed briefly above (at 4.10.5). Possibly, also, chain ladders were used (Figure 25 shows a modern example).

4.13.3

In addition to this range of smaller ladders, we have to reckon with the possibility that ladders more like the large wheeled ladders of modern times were in use. The sambuca or tollenno, as described respectively by Biton (57-61) and Vegetius (de re mil. 4.21), is the only mobile ladder for use on land that is attested, and for an account of this - and of the various problems concerned with reconstructing it - we can best refer to Marsden (1971, 92ff). This machine (which differed considerably from the sambucae mounted on ships, and using their masts for support) consisted of a chassis with a trestle mounted on it, at the top of which was a bracket to support a long ladder which could be elevated or depressed. There was provision for a heavy counterweight to assist rotation of this bracket and the ladder. The hinged fly-ladder was to assist men in getting on to the main ladder.

This sambuca or tollenno was potentially very useful for getting men on to enemy walls or towers, though it does not appear in any accounts of actual sieges. Its usefulness in firefighting must be reckoned as rather less. The long ladder is said to have been 60 feet long, and it is made in one piece; thus there would have been difficulties in manoeuvring it round the streets. Secondly, the machine would have been too heavy to take to fires, particularly if we include in the total load the weights to be used at the counterpoise - possibly in the region of 2 to 3 tons.

4.13.4

Aeneas Tacticus refers to the use (by an army under siege) of boar and stag nets and rope ladders for rapid retreats over the wall by men gathering stones, and they may also descend in the baskets intended for putting the stones in (38.7f). At a fire, such devices would have taken up valuable time from activities with greater chance of success, and they are unlikely to have been used much, if at all, by the Vigiles.

4.14.1

We have met the term 'ferramenta' in connection with the equipment used by the matricarii (A.D.535 and later: see Appendix II) and considered the possibility that it included some sort of hook ladder (4.10.5; 4.13.2). 'Ferramenta' is, of course, a general name for iron tools and implements, and it includes the range of equipment which is often very versatile and now has the name of 'small gear'.

Small gear varies according to the type of situation and the type of appliance in attendance. It usually includes a full range of carpenter's

tools, metal-cutting tools and a fair range of builder's tools, together with any special equipment for particular local hazards. For example, appliances which may have to work on or near railway lines may carry train sirens so that a watchman can give warning of approaching trains. Again, an ordinary plastic dustpan with brush is very versatile, since it can be used for clearing up generally, baling water, or collecting evidence if there are suspicious circumstances. Naturally the usefulness of such equipment depends very much on the initiative of the individual firemen.

Among other equipment of this general type, though somewhat larger, are jacks, lifting gear, and lighting sets, which may be carried on an emergency tender or an ordinary appliance. At the largest scale, there are special vehicles with winches and cranes which tend to be used most frequently at motorway crashes.

Much of the above equipment is used in rescue work or in getting at fires, as opposed to actually extinguishing fires. In the case of the Vigiles, we should not think in terms of extensive rescue work not connected with fires. The nightly patrols will have had their time filled with looking for fires and putting them out, and any additional work of a "civil defence" nature must have been secondary. Their small gear must have included a full range of tools for breaking in to buildings, together with equipment to supplement their axes for demolition directly connected with firefighting and rescues. It has also been suggested to me by Sig. Magrini that the Vigiles will have used many nails, both for temporary repairs and propping up collapsing buildings, and also for making footholds when access had to be improvised.

It follows that most of their small gear will have been in the nature of carpenter's and builder's tools. If they also used larger pieces of equipment such as winches, these will not have been used so frequently, and the Vigiles might have relied on builders to provide them when necessary. We should note the possibility that the Vigiles used emergency lighting: for the evidence which might well concern this, see section 4.31. 5-7 on sebaciaria.

For the wide range of tools available to the Vigiles, reference may be made to any of the larger museum catalogues or excavation reports.

4.15.1

Scopae are included in the list of domestic firefighting equipment in the Digest (33.7. 12.18), but are not otherwise attested in connection with firefighting. BR (p.97) writes of them: "Scopae are brooms made of twigs; it is difficult to see how these were used in fire-fighting, unless we are here in the presence of a technical use of the word."

4.15.2

We may accept that the scopae were brooms made of twigs, just like the most common type of broom used in Italy today. As such they closely resemble a type of fire-beater, in which the twigs, bristles or flails help to extinguish a fire by breaking up the burning material, depriving the fire of fuel. If this analogy is valid, then 'scopae'in the Digest passage is being used in a special and possibly technical sense, of "firebeater".

4.16.1

Sponges are included in the list of household firefighting equipment (Digest 33.7.12.18) and are attested as being carried to fires by the

later matricarii (Schol. Iuliani antecessoris in Const.xxiii.88; and also see Appendix II). BR (p.97), somewhat at a loss as to their use, suggested that "possibly they were for sluicing water over walls to prevent their catching fire so easily". But buckets would have been more effective and more readily available. Blackstone (1957,3), in one of his rare references to other historians of firefighting, commented thus:

> "nor can any fireman accept the theory of classical scholars who have made the Vigiles their study that the sponges were used for sluicing water over the burning buildings. Perhaps they were used with the brooms for clearing up water damage after the fire and the modern salvage tender was anticipated by nearly two thousand years."

The "brooms" to which he refers are the scopae (firebeaters), on which see 4.15.

Blackstone appears less implausible than BR on this point, but he is unlikely to be right. Although there is nothing inherently improbable in the provision of salvage gear, the remainder of the items in the list in the Digest are all for actual firefighting, and we should therefore consider the possibility that the sponges might have been used in firefighting rather than salvage.

There is, in fact, one other possible use, and that is as a face mask, to prevent the breathing of smoke. The effect of some such protection is so obvious that it must have occurred to the Vigiles - as it evidently did to householders. The technique is not, it is true, completely satisfactory and the Manual specifically warns against its use (6a, p.60):

> "Wet face cloths, wet sponges, etc., remove some of the larger particles when smokey air is inhaled, but give no protection against asphyxiation from oxygen deficiency or excess or carbon dioxide, or poisoning from excess of carbon monoxide, and accordingly tend to give

a false sense of security. Their use is not recommended",

[Home Office italics]

But despite such warnings, people do persist in using smoke filters, nor is the effect always dangerous. Very often there is sufficient oxygen available for firefighting and rescues to be performed without the aid of breathing apparatus, and, indeed, many types of fire only burn well when there is plenty of oxygen. When it is remembered that the Vigiles, without hoses or powerful pumps, would have had every reason for entering buildings, and that, moreover, it was usual for Roman rooms to open into the fresh air or at most communicate with the open air by one other room or by a passage, the use of sponges would not have been as dangerous as the modern fireman might expect. This interpretation gains support from the matricarii text: why should sponges have been brought to the fire in the first attendance, if not for use as smoke filters? Since every fire could potentially have become a wide conflagration, salvage equipment would surely have waited. Nor would the Romans have had any clear notions about the dangers from carbon monoxide or excesses of carbon dioxide: if they felt light-headed, they would just have come out and let a relief take their place.

It is probable that the Vigiles used sponges as smoke filters, though since wet cloths and even moustaches can serve just as well we should not think of the whole patrol as carrying sponges. On the other hand, a certain number will probably have been carried by the patrols, since the patrols had to get at the fire and start the rescues before any reinforcements could arrive.

4.17.1

On ropes, there is little that can be said in detail. Ropes are not even

included in the list of domestic firefighting equipment (Dig.33.7.12.18), though in view of the military uses of ropes (and cf. Aeneas Tacticus 38.7f., above 4.13.4) the Vigiles are more likely to have used them than are civilians. Figures 1 and 2 show various uses of ropes in connection with firefighting and rescues at the fire in Naples, and it is possible that the Vigiles used them in similar ways. It should, however, be remembered that the Vigiles had less chance of extinguishing a fire once it got out of hand, and that the extent to which they could use ropes in the ways illustrated were correspondingly reduced. Also, they had a smaller range of equipment which would be useful high up in a building and which would need to be hauled aloft. In general, of course, the ways in which ropes were used depended primarily on the initiative of the individual firemen.

4.17.2

Pliny describes ropes made of esparto in such a way as to imply that they were suitable for firefighting (N.H.19.29f):

> "Hinc autem tunditur [spartum] ut fiat utile, praecipue in aquis marique invictum: in sicco praeferunt e cannabi funes; set spartum alitur etiam demersum, veluti natalium sitim pensans. est quidem eius natura interpolis, rursusque quam libeat vetustum novo miscetur. verumtamen conpelectatur animo qui volet miraculum aestumare quanto sit in usu omnibus terris navium armamentis, machinis aedificationum aliisque desideriis vitae."

They were strong, good in wet and dry situations, and easy to repair.

4.17.3

It has been suggested that the term 'sparteoli' as applied to the Vigiles should be referred to the type of bucket used by them (above, 4.7.3). Ropes were not a distinctive or prominent feature of Roman firefighting, and we do not need to consider a derivation connected with ropes.

4.18.1

Centones are attested in domestic firefighting (Dig.33.7.12.18) and in military use as described below; and collegia centonariorum assisted with urban firefighting in the western part of the Empire (for the basic evidence for the use of collegia centonariorum, which is epigraphic,see de Ruggiero, s.v., and also the discussion below at 7.9.4). Whether, and how far, the Vigiles used centones, is the question most in need of our attention.

4.18.2

The only extant descriptions of centones actually in use in connection with firefighting concern their use by the army. In each case they were fixed around siege engines, towers or ships. Sisenna (4, fr.107) records:

> "puppis aceto madefactis centonibus integuntur, quos supra perpetua ac laxe suspensa cilicia obtenduntur".

The vinegar (acetum) was intended to make the centones fire-resisting (see below, 4.21.4 & 8). Caesar describes the use of centones in conjunction with protective layers of various materials (B.C.2, 9 and 10):

> "eamque contabulationem summam lateribus lutoque constraverunt, ne quid ignis hostium nocere posset, centonesque insuper inicierunt, ne aut tela tormentis immissa tabulationem perfingerent aut saxa ex catapultis latericium discuterent."

> "lateribus lutoque musculus ut ab igni qui ex muro iaceretur tutus esset contegitur. super lateres coria inducuntur, ne canalibus aqua immissa latera diluere posset. coria autem, ne rursus igni ae lapidibus corrumpantur, centonibus conteguntur."

Mere exposure to fire (e.g. by radiation) could have been countered by the use of tiles and clay; the centones, like the coria, provided protection against physical blows as well. Vitruvius describes a fairly elaborate protection against blows for a testudo (10.14.3):

"percrudis coriis duplicibus consutis, fartis alga aut paleis in aceto maceratis, circa tegatur machina tota. ita ab his reicientur plagae ballistarum et impetus incendiorum."

A little earlier, he refers to the use of rawhides for protection against blow (Diades' tower, 10.13.5):

"tegebat autem coriis crudis, ut ab omni plaga essent tutae."

The use of rawhides was long-established, being mentioned by Aeneas Tacticus (32).

4.18.3

These military centones were clearly different from those in use in civilian firefighting, since there was no need to protect civilian buildings from physical blows. The difference need not have been other than in size, however. In the normal way, centones were made of scraps of cloth or leather, and were either thick stuff like a blanket or else padded like quilts or mattresses. (Thes. Ling. Lat.s.v.). It is quite probable that the protection for the testudo described by Vitruvius (10.14.3) was called 'cento'.

4.18.4

In the majority of civilian firefighting - both by collegia centonariorum and by ordinary individuals - the centones were probably ordinary fire blankets. These can be used to smother practically any type of fire while it is still small, and do not require a great deal of preparation (other than the actual provision of blankets). Centones made of cloth are more flexible than leather, and this is probably why we do not find collegia coriariorum engaging in firefighting. It is unlikely that fire blankets were made of asbestos, like the modern ones. Asbestos was known, in Africa at least, to be incombustible, but its only use was for making incombustible

table napkins (Pliny N.H.19.4.19f), useful amid the dangers of a banquet, but not progressing beyond a novelty.

Centones could also have been used as protective clothing. though there is no explicit evidence for this in connection with firefighting. (Caesar records the use of centones and coria for making clothing to give protection against arrows, apparently without success: B.C.3.44.7; 45-46.1)

4.18.5

The common use of collegia centoniariorum in firefighting is explicable by the general lack of adequate supplies of water for firefighting (both lack of actual water and also lack of means to get water on to a fire).

4.18.6

We know that the Vigiles made widespread use of water for firefighting and that they had to carry buckets with them on their patrols. It is most unlikely that they used blankets in addition. Their sole use for blankets, in fact, would not have been for firefighting itself, but for rescues, in situations where the only way to get people out of a building quickly was via the windows. Jumping from windows - or throwing people out - is not a totally successful method of escape or rescue, since untrained people are liable to break their ankles, backs or necks. As a last resort, however, it is difficult to argue against it. The Vigiles are unlikely to have provided their own centones since they had more useful procedures open to them.

4.19.1

The bucinator is the only instrumentalist attested in the Vigiles. His abbreviated title BVCC, BVC or BV occurs five times on VI.1057: twice in

Century 1, and once each in Centuries 4, 6 and 7. It survives three times on VI.1058, though there may have been other examples in the damaged portions of the stone. VI.221 records a "buc(inator) in (centuria)"; since on 1057 there is not one bucinator per century, this title presumably means that, although the bucinatores functioned at cohort level, this particular one was carried on the books of this particular century. A bucinator of the Seventh Cohort is attested at Ostia (XIV.4526a).

4.19.2

BR (p.88, n.1) refers to Vegetius 2.22 for the distinction between bucinatores and cornicines and tubicines, the latter pair sounding tactical or field calls while the former sound barrack or routine calls, and concludes: "Thus the latter [cornicen and tubicen] do not appear in the Vigiles." However, the military analogy is not particularly apt, since a large amount of the signalling of the Vigiles must have been alarms and calls to turn out. For such signalling the bucina was a natural choice, being in general use for various types of summoning over considerable distances (Thes. Ling. Lat., s.v.).

4.19.3

It is open to doubt whether the Vigiles used any sort of instrument for giving instructions in the course of actual firefighting. Braidwood experimented with various audible signals, and writes thus (1830,47):

> "Amidst the noise and confusion which more or less attend all fires, I have found considerable difficulty in being able to convey the necessary orders to the firemen in such a manner as not to be liable to misapprehension. I have tried a speaking-trumpet; but, finding it of no advantage, it was speedily abandoned; It appeared to me indeed, that while it increased the sound of the voice, by the deep tone which it gave, it brought it into greater accordance with the surrounding noise. I tried a boatswain's call, which I have found to answer much better. Its shrill piercing note is so unlike any other sound usually

heard at a fire, that it immediately attracts the attention of the firemen. By varying the calls, I have now established a mode of communication not easily misunderstood, and sufficiently precise for the circumstances to which it is adapted, and which I now find to be a very great convenience."

The first four of the calls which he described were to distinguish the four pumps and their crews, and the nine other calls were all instructions concerned with the operations of the pump. No call was concerned with anything else, and Braidwood evidently did not find any use for other calls. Since the siphon would not have demanded the complicated orders of the Edinburgh pumps, the Vigiles are unlikely to have needed anything to supplement shouted instructions.

4.19.4

For sounding alarms, the Vigiles needed a means of warning the inhabitants, a means of informing the home station (whether castra or excubitorium), and a means of summoning assistance from another cohort. Dio (54.4) writes of night guards in cities carrying bells (κωδωνοφορούσιν) to warn the inhabitants - a passage referring specifically to a dream of Augustus in 22 B.C. but probably reflecting a general practice of Dio's own day also. It is possible that the Vigiles carried bells, particularly since there were not enough bucinatores to operate one with each century. However, the problem was not to warn the inhabitants - any loud noise would have worked. It was more important to have a reliable method of informing the home station of fires and of the need for assistance. To have used bucinae for this would have necessitated a very large number of calls, to identify the location of the fire and the type of reinforcements required, and runners must have been used (in pairs, for reliability). At the level of the patrols, then, it was both pointless and disadvantageous to use bucinae. Where they would have been useful, and indeed essential,

was in signalling from one station to another. It would have been easy to hear a trumpet across the roofs of Rome, and a relatively small number of signals would have been needed. In addition, the bucinatores would have sounded alarm calls within the stations themselves. If it was normal to have about five bucinatores per cohort (as there were in the Fifth Cohort in A.D.205, VI.1057), there were sufficient to maintain 24 hour cover at the castra, possibly with two bucinatores being detached to the excubitoria at night, and with a further one being stationed at Ostia or Portus. Even if there was just one station each at Ostia and Portus, there was still a need for bucinatores to sound alarm calls within the stations and to sound routine calls.

4.19.5

Confirmation that bucinae were used for fire alarms comes from Petronius (Sat.74), in a passage which shows that trumpets signified either a fire or a death, on some occasions at least:

> "Haec dicente eo gallus gallinaceus cantavit. Qua voce confusus Trimalchio vinum sub mensa iussit effundi lucernamque etiam mero spargi. Immo anulum traiecit in dexteram manum et 'Non sine causa' inquit 'hic bucinus signum dedit; nam aut incendium oportet fiat, aut aliquis in vicinis animam abiciat. Longe a nobis. Itaque quisquis hunc indicem attulerit corollarium accipiet.'"

4.20

In these days of motorised fire appliances it is natural to wonder whether the Vigiles used horses. In more modern times, horses were used when the pumps and ladders were too heavy to carry and engines had not been invented, but until the eighteenth century it was very common for all hauling of equipment to be done by men.

Basically, however, the Vigiles were a different sort of fire brigade, since their first attendance was not the arrival of pumps and ladders, but the patrol, equipped with buckets and axes. With the number of men available for patrols, there was an excellent opportunity for detecting and extinguishing fires before they reached the size at which pumps would be necessary. Thus the sort of situation in which horses were used in more recent times did not exist for the Vigiles.

There are two situations in which the Vigiles might have used horses. We shall see, in connection with sebaciaria, that there is some evidence that the sebaciarius rode a horse (below, 4.31.5-7). Here, the horse served to carry torches and also to carry a messenger to summon reinforcements. Secondly, we cannot rule out the possibility that when pumps were summoned they were brought on horses or in carts pulled by horses. The surface of the streets of Rome, and their steepness and narrowness, must have restricted the use of carts to the main thoroughfares, so that, even if horses could be used in some areas, the Vigiles must none the less have been prepared to manhandle all their equipment.

This minimal use of horses need not surprise us, nor imply that the Vigiles must have been seriously restricted. There are plenty of analogies in recent times for the sole use of manpower for conveying equipment (e.g. pumps carried shoulder-high in India), and, overall, the distances to be covered in Rome were comparatively small. With 21 fire stations spread throughout the City (see 7.10, esp. 7.10.8, for their distribution), there would have been a very short time interval between taking the equipment out of the fire station and placing it ready for use at the fire. The lack of need for horses arose directly from the provision of the patrols and the distribution of the fire stations.

4.21.1

This section is concerned with 'acetum' or 'ὄξος'. BR (p.97) has this to say on it: "We are familiar nowadays with chemical fire-extinguishers, and it is instructive to find a beginning of this in Roman times. It is quite possible that this acetum was enclosed in vessels which were thrown into the fire after the manner of the present-day 'Hand-grenade' type of extinguisher. (If this is so, the projecting of these vessels may be a possible use for the Ballistae, if such existed.) Its principal use, however, appears to have been to soak the centones." Ballistae and centones are discussed at 4.12 and 4.18; we now examine the evidence for acetum.

4.21.2

We cannot approach the study of acetum in quite the same way as for axes or buckets. With equipment like the latter items, it is quite justifiable to assume in the absence of detailed discussion that a resourceful Roman fireman could have used them in the same sorts of ways as a resourceful modern fireman, and, indeed, it would be unreasonable not to do so. Acetum, however, cannot be understood simply as a chemical. We have to look at its uses with some considerable precision, and see what its effects are likely to have been, and this means deciding what acetum actually was and what its chemical and physical properties actually were. Indeed, the fire grenades to which BR refers are a salutary reminder that actual effectiveness may vary widely from the expected effectiveness (which may be illusory). These devices consisted of glass containers which contained water to which chemicals had been added, and upon the outbreak of a fire they fell from their mountings or broke (if they were fixed on the ceiling) or else were thrown on to the fire. The resulting discharge of dilute chemical was

supposed to be more effective than water on its own. The fact is, however, that these were not more effective than plain water, and the method of application was not very efficient, and their reputation suffered a considerable setback when a factory which manufactured them caught fire and burned to the ground. They have not been made now for several decades, though there are still premises which have them installed. One can only hope that these remaining ones are never put to the test. Their owners' faith in them is quite unshakable. Extinguishers in which a chemical reaction produces gas which drives out water are, of course, something different, since the extinguishing agent is the water. Chemical extinguishment of fires is possible, though only in specialised cases, where the extinguishant is selected for the particular risk.

4.21.3

Although the lack of a precise chemical knowledge produced considerable confusion in ancient terminology for identifying substances, there is no doubt about the mature of 'acetum' or 'ὄξος'. In practically every example of its use where the meaning may be inferred it denotes vinegar or sour wine (Tac.Hist. 5.6 appears to be a unique exception). It included both spoiled wine and also vinegar specially produced, but from the point of view of its availability it is vital to remember that it also included the cheap and everyday wine of the Roman army, their vin ordinaire (Davies 1971,124). Thus the term 'vinegar', though chemically accurate, has a narrower application than 'acetum' or 'ὄξος'. Chemically this substance was dilute acetic acid (or ethanoic acid), and as such it was the commonest dilute acid available in ancient times. It was used generally for a wide range of purposes: cleaning, flavouring, disinfecting, preserving, as a refrigerant drug, and even for magic (Thes.Ling.Lat., s.v. de usu).

Its use in connection with what may loosely be termed firefighting has produced the greatest controversy over any of its uses, and to this we now turn.

4.21.4

There are just three pieces of evidence that acetum was used for throwing on to fires. First, Aeneas Tacticus describes its use as follows (34):

"Ἐὰν δέ τι οἱ πολέμιοι πειρῶνται ἐμπιπράναι ἰσχυρᾷ σκευασίᾳ πυρός, σβεννύειν χρὴ αὐτὸ ὄξει· οὐ γὰρ ἔτι ῥᾳδίως ἐξάπτεται."

"If the enemy tries to set anything on fire with powerful incendiary equipment you must put out the fire with ὄξος, for then it cannot easily be ignited again..."

Aeneas' explanation that the use of ὄξος is to prevent the material from being ignited again is probably intended to show why ordinary water was not to be used. Secondly, acetum is included in the Digest's list of firefighting equipment which may be found in houses (33.7.12.18, quoted above at 4.5.) Thirdly, acetum was used in fire-setting (the technique of heating rock and then cooling it suddenly in order to break it). This is described by Livy (21.37.2f), referring to Hannibal in 218 B.C.

"Indè ad rupem muniendam per quam unam via esse poterat milites ducti, cum caedendum esset saxum, arboribus circa immanibus deiectis detruncatisque struem ingentem lignorum faciunt, eamque, cum et vis venti apta faciendo igni coorta esset, succendunt ardentiaque saxa infuso aceto putrefaciunt. Ita torridam incendio rupem ferro pandunt molliuntque anfractibus modicis clivos ut non iumenta solum sed elephanti etiam deduci possent."

Pliny also refers to this technique, more briefly (N.H.33.71):

"occursant in utroque genere silices; hos igne et aceto rumpunt, saepius vero, quoniam id cuniculos vapore et fumo strangulat, caedunt fractariis CL libras ferri habentibus..."

And there are other mentions of it (Diodorus 3.12-13; Vitruvius 8.3.19).

More generally, vinegar and sour wine were held in high esteem as coolants. Plutarch praised them thus (Q.Conv. 652F):

"οὐδὲν δὲ τῶν σβεστηρίων ὄξους πυρὶ μαχιμώτερον, ἀλλὰ μάλιστα πάντων ἐπικρατεῖ καὶ συμπίεζει τὴν φλόγα δι' ὑπερβολὴν ψυχρότητος."

Aulus Gellius wrote (17.8.14):

"Acetum autem omnium maxime frigorificum est atque id numquam tamen concrescit".

Macrobius seems to connect the cooling property of vinegar with the violence with which it made flames spit (Sat. 7.6.12):

"Quid aceto frigidius, quod culpatum vinum est? Solet enim hoc ex omnibus umoribus crescentem flammam violenter extinguere, dum per frigus suum calorem vincit elementi."

There is a reference to the coldness of acetum in Pliny, though this is hardly more than a mention of a superstition - an antidote to whirlwinds for navigators (N.H.2.132):

"tenui remedio aceti in advenientem effusi, cui frigidissima est natura".

Similarly, the sprinkling of wine to extinguish funeral pyres is not evidence for regular firefighting (Pliny N.H.14.88). Plutarch, Gellius and Macrobius are not independent witnesses to the actual effectiveness of acetum for extinguishing fires, though they do reveal the persistence of the belief that acetum was good for cooling.

Finally, acetum is used for soaking military centones (on which see 4.18.2. above).

"Puppis aceto madefactis centonibus integuntur" (Sisenna 4, frag. 107)

"Perc rudis coriis duplicibus consutis, fartis alga aut paleis in aceto maceratis, circa tegatur machina tota" (Vitruvius 10.14.3)

This use is analogous to that mentioned by Aeneas, since he recommends ὄξος for its value in preventing fires. The point of soaking the centones was to make them fire-resisting. Normally, of course, the army used water for putting out fires, though sand might also be used (archaeological evidence from Corbridge: see Appendix IV): Diades, it may be remembered, provided copious supplies of water in his tower in case of fire (Vitruvius 10.13.6).

4.21.5

The story about Hannibal has produced the greatest volume of comment on these specialised uses of acetum, but much of it is subjective and some actually unreasonable. Hoover and Hoover (1950, 118f) summarise a good deal of opinion in their note on fire-setting in their commentary on Georgius Agricola's De Re Metallica of 1556. They note, and seem to endorse, a suggested emendation of Livy's account to read "infosso acuto" in place of the transmitted reading "infuso aceto". There is no textual justification for this emendation, and the comment of Hoover and Hoover, that real scholars disbelieve the story about the vinegar while soldiers take it seriously but offer foolish explanations, invites the question why it should not be true. Not merely might we have to emend all the passages in which the word 'acetum' occurs, or translate them differently, but we might even be forced into assuming that only rational and correct practices were to be found in the ancient world. Singer and others (1956,8) follow Hoover and Hoover in their discussion of fire-setting. They refer to Diodorus [3,12 and 13] and Pliny (N.H.33.21.71) and comment: "Though mentioned by both Pliny and Diodorus (first century B.C.) it is hardly likely that vinegar was used. It would have had no effect except on limestone and little on that." In their main text they do not discuss the problem, saying simply, "It is probable that water was used to hasten the cooling and so promote

cracking of the rock." One wonders how many instances of vinegar being used in fire-setting would be needed to convince them; Vitruvius (8.3.19) provides another. Livy, Diodorus, Vitruvious and Pliny cannot be written off so lightly.

4.21.6

Before we return to ancient beliefs as to the effectiveness of acetum, it will be helpful to consider its actual effectiveness. Ancient vinegar was produced (both deliberately and accidentally) from the fermentation of carbohydrates (e.g. sugar, starch) which produced alcohol (i.e. ethyl alcohol), which in turn was oxydised to become vinegar (i.e. ethanoic acid or acetic acid). This acid was dilute, since in the conversion of ethyl alcohol into acetic acid — $CH_3\ CH_2OH + O_2 \rightarrow H_2O + CH_3COOH$ — 100g of alcohol mixed with 695g of oxygen (236 litres of air) produces 39g of water and 130.5g of acid; if we take into account the water already in the wine and subsequently mixed with the alcohol the proportion of water is even higher. Pure (undiluted) acetic acid is produced by a different process which seems not to have been known to the ancients. We are therefore dealing with a dilute acid.

For general purposes of fire extinction, acetic acid is unsuitable. The concentrated acid yields flammable vapours, it is capable of producing chemical reactions which with certain substances can evolve heat, and it can cause chemical burns to the skin. Chemically, therefore, it is not useful in this connection. In terms of cooling power, it is inferior to water: its specific heat is about half that of water (0.5118) and its latent heat of vaporisation only 96.8 cal/g at its boiling point ($118^{o}C$) compared with water's 537 cal/g. Thus it needs far less heat to raise it to its

boiling point and then evaporate it than does water. Clearly, the less acid it contains, the more it approaches the good qualities of water. There is one point of interest in connection with specific heat and the conversion process mentioned in the last paragraph, and this concerns the ethyl alcohol. A mixture of 20% alcohol in water actually has a greater specific heat than water: 1.046, "greater than that of any other liquid below 100°" (Partington 1951,219): this is mentioned here just to forestall comment that this was the real point of the use of "vinegar" - that it was really the alcohol mixture that was being used. The increase in specific heat would have had a negligible effect on firefighting; moreover, it is the conversion of water into steam that removes most heat from a fire, and the alcohol would not have been helpful at that temperature. For cooling and chemical extinction of fires, then, acetic acid is not effective. When we look at the ancient applications more specifically, the uses of acetum listed above at 4.21.3 should be borne in mind.

4.21.7

The evidence that acetum was regularly thrown onto fires is somewhat ambiguous. On the one hand, Aeneas Tacticus implies that normally some other extinguishant would have been used (i.e. water), so that in this case the vinegar is used in order to achieve the benefit of soaking combustible material (see below). On the other hand, Plutarch and Macrobius could be taken to imply that vinegar was commonly used (even if this were for no good reason), and it may be that the inclusion of vinegar in the list of domestic firefighting equipment in the Digest reflects an unsound belief in its effectiveness. There is no reason, however, for assuming that vinegar was not widely used, in an ill-informed way; it certainly had a good reputation as a cooling liquid. It lies beyond the scope of this thesis to explore this reputation any further.

4.21.8

So far as the centones and Aeneas' preference for vinegar are concerned, the explanation probably lies in vinegar's suitability as a preservative and a penetrant of grease. We are familiar today with the heat produced by bacterial action, such as is found in compost heaps, haystacks and stacks of raw hides. If such materials are allowed to continue to heat up, they eventually either break out in spontaneous combustion, or else decompose into substances which are ready to burst into flames the moment air is admitted (as when a hot haystack is pulled apart). Once they have passed the dangerous stage, and have become completely dry (so that bacterial action is inhibited), the risk of spontaneous combustion is less while the risk of normal accidental ignition is now predominant. The centones would have behaved in the same way as a compost heap or haystack while they were drying, and, once dried, would have been susceptible to normal external ignition. The use of vinegar will have (a) inhibited bacteria, thus decreasing the risk of spontaneous combustion, and (b) kept them damp, thus reducing the risk of accidental ignition. Accidental ignition, in this context, of course includes firing by the enemy. The leather itself would have caused a problem if plain water had been used, since the grease on the raw hides would have prevented the water from soaking in, and bacterial and pyrolitic decomposition would have taken over. Vinegar is a good solvant of organic compounds and grease in particular, and could thus penetrate right into the leather. One side-effect of the use of vinegar is that the fibres in the leather and the stuffing would have been weakened, though this would itself have brought the benefit of being able to fit the centones really close and tight round the corners of the siege towers. It is not entirely clear what materials Aeneas had in mind when he recommended vinegar, but if there is a practical basis for his recommendation it probably is the same as applies to the centones.

4.21.9

On fire-setting, we have seen that there is no reason to doubt that vinegar was used, and it remains now to note the best explanation so far put forward. Bailey (1929,199) approached the evidence more sympathetically than most writers, and suggested the following explanation:

> "These stories [i.e. about fire-setting with vinegar] are no doubt due to a combination of factors. Firstly, when cold water is poured on very hot rocks, the rocks are more or less disintegrated [i.e. spalling on a grand scale]. Secondly, vinegar attacks slowly certain rocks of the limestone type. Probably the liquid used by Hannibal and the miners was mainly water, to which some vinegar had been added in a half-scientific, half-superstitious way."

My only comment would be that since the vinegar was in any case a large part water, it was probably used 'neat' on the rocks. In any case, if Hannibal's army was anything like the Roman army, they would have had plenty of vinegar (wine) with them, which would have saved them the time and trouble of obtaining water.

4.21.10

To return now to the Vigiles. Not merely have we seen that the uses of acetum in connection with firefighting and cooling were very specialised, but it is also apparent now that the Vigiles would have had no need to use acetum. Their system of patrols was partly based on the availability of water (on this see also 7.11.19), and, if they are unlikely to have carried water with them, they are even less likely to have carried vinegar or wine. Since it doubtful that they used centones (see 4.18.6), they had no need for acetum. It is also worth noting that, if there was any consistency in the applications of acetum, it is possible that the

acetum kept ready in houses was for the purpose of soaking the domestic centones: but at this point we go too far into the realm of speculation. So far as the Vigiles themselves were concerned, we must conclude that acetum was not among their equipment. There is no evidence that they used any kind of chemical extinction.

4.22.1

Formiones are included in the list of firefighting equipment in the Digest (33.7.12.18). These could have been baskets used for rescues, but it is more likely that, in view of the basic simplicity of the equipment listed, and its domestic nature, they were simply stretchers for the injured. There is no direct evidence on this point.

4.23.1

Perticae also occur in the list. Poles could have been used in various ways, but since there is no indication of what, if anything, was at the top of the poles, we cannot go further than to suggest that they might have been used for demolitions, shoring up, or for rescues in situations in which a ladder could not be used. In any case, they cannot have been other than ancillary to such basic equipment as pumps, axes and buckets.

4.24.1

We have discussed siphones, unc(in)i, and ballistae, but have not considered what precisely were the functions of the siphonarii, unc(in)arii and optiones ballistarum. If the a bal(?) was concerned with ballistae, he will have worked under the optio ballistarum. No other pieces of equipment gave their names to specialists; we do not hear, for example, of hamarii, scalarii, funarii or dolabrarii, nor of falcarii.

4.24.2

In the Fifth Cohort in A.D.205 (VI.1057) there were two siphonarii (both in the 5th century), one unc(in)arius (in the 7th century), and two optiones ballistarum (in the 4th and 7th centuries). On VI.1058, the corresponding totals are two siphonarii (both in the 6th century), two unc(in)arii (in the 7th century) and one optio ballistarum (in the 4th century), though the damage to the stone may have removed others. VI.1057 is, however, complete, and there is no doubt of the small number of these specialists. It contrasts with the number of bucinatores attested - five on 1057 and three (at least) on 1058. It was suggested above that the bucinatores had an important role in the communications in the course of firefighting (see 4.19.4); can so few of these other specialists have played a key role in firefighting?

4.24.3

We have seen that there could have been up to six men operating a single pump (and possibly even more) and around ten or eleven men per ballista. It is implausible that a single team of men was assigned to each of the specialists, since they would either have been grossly overworked or else largely redundant. If the specialists were in charge of the operation of their equipment during firefighting, they must often have controlled several teams each. They cannot, however, have taken overall charge (qua specialists with their own equipment), though when the efforts at firefighting centred on their equipment they will have become correspondingly important.

4.24.4

There is rather less reason for the unc(in)arii to have taken charge of the use of hooks, since any fireman could have used them. Moreover, although

it is possible that the siphonarii and optiones ballistarum directed the tactical use of their equipment, their main contribution must have been technical and concerned with the equipment rather than with fire-fighting. Indeed, it is quite probable that the reason for these technicians to attend fires (assuming that they did) was to protect the pumps and ballistae from damage caused by misuse. It is one thing to see the need for a pump or a ballista and to order it on; it is quite another thing to ensure that for as long as it is needed the equipment continues to work reliably.

We do not know where or how the Vigiles obtained most of their supplies. However, whether they bought them in Rome or had them specially made in military workshops, most of their equipment presented no special problems. Buckets, axes, ropes, ladders or lanterns were in general use, and could have been obtained and repaired without difficulty. Pumps were rather different, partly because they seem to have been peculiarly a firefighting tool and partly because they were likely to give trouble at fires and to need speedy specialist repairs. This would have been sufficient reason for the Vigiles to have their own siphonarii, and a small number would have been adequate for the maintenance and repair of pumps. The ballistae were probably obtained from the same source as those of the Praetorians, and the optiones in charge must have had some of the skills and abilities of the architectus who built them. It is less easy to see why the hooks should have presented a problem, though it may be surmised that the Vigiles could not rely on a normal public supply, particularly for the quantities required, and it is possible that the unc(in)arii had to look after other equipment as well, such as axes. Possibly these men were named after the unc(in)i because that was a distinctive piece of firefighting

equipment, whereas a title like dolabrarius or falcarius would not have been distinctive.

4.24.5

The hypothesis that these specialists were primarily technicians is consistent with the list of immunes in the Digest (50.6.7.6), which includes many technicians. Principally, they were not firemen, and if they did turn out to fires this was secondary to their main function. Much of their routine work must have been done during daylight hours.

4.25.1

We have met the technicians in the Vigiles, a small number of men named after their specialist pieces of equipment. Outside the Vigiles and Rome, certain collegia of tradesmen functioned as volunteer firemen, and it was probably a condition of their being permitted to exist at all that they undertook to attend fires. The three collegia most commonly involved were those of fabri, centonarii and dendrophori, sometimes referred to collectively as the 'tria collegia'. The best discussion of the contribution which these particular collegia made to firefighting is that of de Ruggiero (1895-, s.vv), though his discussions fall short of describing what the men actually did at fires.

4.25.2

Centonarii present the least difficulty. Centones were made of thick cloth, and were useful as fire blankets and as padding for people to jump onto; they could also provide a measure of protection from heat for getting into a burning building for the purposes of rescue. Although it is possible to extinguish fires with blankets, it is doubtful whether

centones were relied on as a means of extinguishing fires. The lack of adequate water supplies in many cities must have made them more important than they are in modern times, but even so their applications were limited. Once a fire had gained a strong hold, the centones must have been used mainly in connection with rescue.

4.25.3

Dendrophori had two functions in their normal life. Each year, on 22nd March, they carried a sacred pine to the temples of Magna Mater (and the greater part of the evidence for dendrophori relates to this function). In industrial life, they seem to have been responsible for the hewing and transport of timber (de Ruggiero, s.v.). They were thus involved with heavy lifting. Their value at fires was probably greater after the fire than during it. It is possible, of course, that they could assist with rescues during the actual fires, particularly if makeshift access to upper floors was required, but for the job of picking through debris in the search for survivors and for clearing away debris their trade skills were very appropriate. And they would be useful at the stage of rebuilding.

4.25.4

Fabri were workers in metal, wood or stone (Thes.Ling.Lat.sv.). They covered a variety of skills, and will have included many of the builders. But, while a knowledge of building construction will have been of great assistance in fighting fires, it will not of itself have made the men into good firemen. Braidwood, in fact, found that the usefulness of such men lay in another direction (1830, 44ff). He considered that among retained firemen (i.e. those who followed another occupation and were available for firefighting when called on) the best men were slaters, house-carpenters, masons, plumbers and smiths. Partly, of course, their tradesman's skills

were useful in firefighting, but partly these men made good firemen because they were physically robust and able to endure heat and cold, wetness and fatigue; smiths and plumbers, moreover, were better able to endure heat and smoke. Such factors are likely to have influenced the Roman choice.

4.25.5

These three collegia, then, were the best choice in a situation where the ideal solution of a full-time fire brigade was not acceptable. Between them they provided a reasonable possibility of carrying out rescues and extinguishing fires, but since the men had their own jobs during the day it was not possible for them to carry out patrols like those of the Vigiles. Many fires must quickly have passed beyond their control and led them to concentrate their efforts on rescue.

4.25.6

At the technical level, these collegia were far inferior to the specialists in the Vigiles. The latter were specialists in firefighting, the collegia were specialists in other fields to which the activities of firefighting were not entirely foreign. Confirmation of the low level of firefighting competence of these collegia is found in the trades of others attested in the same context, for example, dolabrarii and scalarii: both with more to contribute to rescues than to firefighting. There is no evidence for collegia of hamarii engaged in firefighting; possibly the general public were expected to bring water (cf. Pliny Ep.10.34: "occursu populi"). It is unfortunate that the level of competence of these collegia is such as to suggest that the Vigiles could concentrate far more than they on firefighting. They tell us nothing about the Vigiles.

4.26.1

On clothing of the Vigiles, there is little to add to BR (p.98 and his Plate VI). It remains the case that the only evidence for the uniform of anyone in the Vigiles is the sepuchral relief of the vexillarius Q.Iulius Galatus (VI.2987). The best available photograph of this is the one published by BR (Plate VI), and inspection of the stone itself has failed to produce a clearer impression of what precisely it represents. The uniform of the vexillarius is clearly military in style, as we should have expected, though there is insufficient clarity to decide whether he is wearing any special protective clothing. It is even impossible to see whether the implement hanging at his right side is a sword or an axe. The helmet possibly has a crest, possibly decorative.

4.26.2

The demands of the job and analogy with the Roman army suggest that the Vigiles will have worn helmets of metal (there was no electricity to provide electrocution problems), and garments of a general military pattern made of thick, heat-resisting cloth (possibly reinforced with leather), with good protection for arms and legs, and thick soled boots. The possibility cannot be ruled out that the Vigiles wore trousers.

It would have been natural for the Vigiles to carry their axes at their waists, and they probably carried other equipment on their belts such as small tools. It is doubtful whether they used special belts by which the men could be attached, for safety, to ladders, ropes or buildings, though again the possibility cannot be ruled out for all possible occasions. Men working at considerable heights could well have been tied or hooked on.

4.26.3

Apart from the lack of direct evidence, our main problem as regards clothing is that there are not any close analogies to help us. The above suggestions and guesses lead one to suspect that the Vigiles made their own adaptation of a normal military uniform. The centurions and tribunes probably looked like ordinary centurions and tribunes.

4.27.1

We have noted that the number of the Vigiles was far in excess of any modern brigade (in terms of firemen per acre) and that we have to beware of attributing functions to them other than firefighting until we have exhausted all the possibilities connected with firefighting. (4.3.2). BR in fact suggested that the explanation for the large number of Vigiles "is probably to be found in the large slave population" (pp.15f), as if they were policemen-cum-firemen like some of the former British police fire brigades. He does not, however, discuss the manpower needs of the two jobs which are actually attested for the Vigiles, fire patrols and firefighting (Dig. 1.15.3).

4.27.2

Most fires start small, and if caught early enough can be prevented from becoming big (Manual 5,23):

> "There is rarely an occasion where a fire could not be subdued, with a minimum amount of damage to building and contents, if a brigade could get to work within a few minutes of the initial outbreak occurring.
>
> Many fires are not discovered in their early stages by occupants of the premises involved, but are only revealed when they have developed sufficiently to become noticeable to passers-by, or from a distance, by which time considerable damage will usually have been caused."

One common solution to this problem is to use a fire patrol, and there are various types of fire patrol, ranging from an intermittent inspection by a night watchman who may have other duties and who may be infirm and incapable of taking action, to a continuous inspection by a patrol who are properly equipped to deal with any fires that their search may reveal. In addition there are the daily and nightly inspections of selected risks such as the Liverpool Salvage Corps perform. Owing to the dangers from aerial bombardment in World War II, a certain amount of antagonism to fire patrols developed among firemen, since it was believed that they might be required to drive around during air raids pouncing on incendiary bombs (though this suggestion was never made officially), but for peace-time conditions there is no doubt of their value.

Such a use of manpower is, however, difficult to justify economically except where the risks to be protected are of very high value (e.g. warehouses), and for this reason automatic equipment is now becoming very common. Automatic equipment has the further advantage that it largely avoids the possibility of human error, so much so that even the false alarms and occasional failures are far less expensive than the cost of employing people. A disadvantage is that, despite its excellence, each type of detector is necessarily selective in its mode of operation, whereas ideally a detector is required which will respond to any of the early indications of a fire, whether it be smoke, heat, flame or distinctive chemical products. Man, with his five senses, is a universal detector, and this is emphasised by a comment from a leading manufacturer of automatic fire detection systems:

> "It is still our opinion that a man is still the best fire detector that exists."

Potentially, then, the fire patrol is a very powerful weapon against fire.

4.27.3

Rapid detection of fires is no use unless the fires can be put out. The Vigiles carried with them on their patrols sufficient equipment for extinguishing fires which were caught while small: axes and buckets (Dig. 1.15.3). There is no statement in the sources that they carried anything else, and - while they might well have done - to comply with the requirements they only needed to carry axes and buckets. Even today, the majority of fires are put out with small-scale equipment, including buckets, and the aim is always to avoid the need to use large pumps.

One difference between the Roman 'first attendance' and the modern 'first attendance' is that nowadays the brigade has to be called and has to travel to the fire, whereas the patrol of the Vigiles which discovered the fire was itself the first attendance, and so could get to work much more quickly than a modern brigade. There was a correspondingly greater chance of preventing a fire from becoming large. The effect was the same as having a fire engine in constant readiness on the doorstep.

4.27.4

In order to have been effective and worth having at all, the patrols must have consisted of a minimum number of men. For the actual search for fires, no definite number would be required. In some streets it would have been sufficient to carry out superficial inspections from the front; in others, it would have been necessary to enter buildings and courtyards. We should not think in terms of something like a parade round the streets (Paoli's "measured tramp of the watch", p.37), but of small groups of men giving the risks individual attention, and quietly listening, looking and sniffing for fires. Such smaller groups would have formed parts of larger groups, the

whole of which could spring into action if a fire was discovered. There is no limit to the number of men who could be employed in looking for fires; it is the firefighting function which sets a lower limit.

4.27.5

Although different fires would need different treatments, it is possible to make some estimates of the sorts of numbers likely to be needed, particularly since we have now seen that the equipment is predominantly on a small scale and entirely hand-operated. With 3,500 men available (later 7,000), the drills could afford to be more generous with manpower than in a modern brigade, and, even if only to avoid chaos and confusion, there must have been a high degree of planning and organisation.

For a smallish fire on or near the ground floor the following manpower might be needed:

breaking into premises, 2 parties of 3 men	6 men
warning inhabitants	1 man
instant bucket chain, say,	20 men
firefighting and rescue: the 6 breakers-in plus, say,	10 men
messengers to station	2 men
in charge, 1 officer	1 man
Total =	40 men

For a medium fire spreading rapidly upwards:

messengers for reinforcements	2 men
breaking in	10 men
keeping occupants quiet	1 man
bucket chain	40 men
firefighting and rescue: the 10 breakers-in plus, say,	10 men
further rescue party to approach via roof	10 men
in charge, 1 officer	1 man
Total =	74 men

For a large fire with little chance of rescuing occupants:

messengers for reinforcements	2 men
rescues	10 men
water for protection of surrounding buildings	100 men
crowd control	40 men
in charge, 1 officer	1 man
Total=	153 men

4.27.6

The first two examples relate to situations with which a patrol would have to cope, and, although no two fires are alike, the manpower needs are typical of those at a small fire. These are large turn-outs compared with many modern turn-outs. If we deduct from the estimates the "extra" men needed in the absence of hoses and motorised pumps and ladders, we reach totals in the region of 20 men, 30 men and 50 men. These are more consistent with modern attendances, though quite often a first attendance to a smallish risk (e.g. a house fire) will consist of around 10 men. For older types of firefighting, however, the larger totals are quite in order (see, for example, the number of firemen in the illustration, Figures 1 and 2).

4.27.7

There is ample evidence for the sort of numbers that are needed when only manpower is available. Blackstone (1957,146) observes that, in the last century, it was common for 400 pumpers to be paid at large fires, and that at a fire in Warrington in the 1850's over 600 pumpers were paid. He also refers (pp.18f) to The True Report of the burning of the Steple and Churche of Poules in London, which records that at the fire at St. Paul's in 1561 about 500 persons "laboured in carrying and filling water"

and succeeded in getting the fire under control in about 8 hours.

It is instructive to compare these figures with those for London in the 1860's (Braidwood 1866, 85). In January 1861 the London Fire Engine Establishment consisted of:-

1 superintendent
4 foremen (1 for each quarter of London)
12 engineers
10 sub-engineers
47 senior firemen
43 junior firemen

117 individuals in all.

There were in addition:-

15 drivers, living at fire stations
37 horses, living at fire stations
4 part-time supplementary firemen, living at stations
4 part-time supplementary drivers, living at stations
8 part-time supplementary horses, living at stations

One third of the men were constantly on duty, and all could be called on. Attendances were as follows

Fire in District	Attendance from District			
	A	B	C	D
A	all	2/3 men 1 engine	1/3 men	-
B	2/3 men 1 engine	all	2/3 men	1/3 men
C	1/3 men	2/3 men 1 engine	all	1/3 men
D	2/3 men 1 engine	1/3 men	1/3 men	all
On boundary	all of adjoining Districts + 1/3 each of the others			

These figures give an average attendance in the region of 60 to 80 men; and they refer to manpower with the benefit of additional unskilled labour for pumping drawn from bystanders.

4.27.8

Since the Vigiles' patrol had to be self-sufficient in the early stages of firefighting, the most suitable unit for each patrol was the century, nominally 80 men when the Vigiles were established and remaining at that figure until A.D.205. After that date, either the number of patrols could have been increased, or the size of each patrol could have been increased, or perhaps a combination of the two was chosen. Moreover, the need for a firefighting unit about 400 to 600 strong was met very conveniently by the cohort, in terms of administration the most obvious reinforcement for the patrol. Again, after 205, when the cohorts became military, there was an improvement in cover.

4.27.9

Confirmation that the Romans were aware of the need for numbers in these ranges may be found in their other arrangements for firefighting. The number of slaves in the familia publica set up for firefighting in 22 B.C. was 600 (see 5.2.2 below). This was sufficient to cope with one fire. Pliny suggested to Trajan that a collegium of fabri be set up in Nicomedia for firefighting, consisting of up to 150 men (Ep.10.33); and an inscription from Hispalis (II.1167) in Baetica records a

> "corpus centonariorum indulgentia eius [i.e. Antoninus Pius] collegio hominum centum dumtaxat constituto".

These brigades consisting of 150 and 100 men would have been adequate for first attendances, and could often have succeeded in containing a fire.

It is probable that Pliny was well-informed on firefighting, since he corresponded with Cn. Octavius Titinius Capito who became praefectus vigilum some time under Trajan (Ep.5.8).

4.27.10

From this comparison of the numbers required for firefighting without modern equipment, we find that the problem which troubled BR and many others - what to do with 3,500 firemen - largely disappears. The notion of a whole cohort turning out to fight a fire is quite acceptable, and indeed, reasonable. It was very convenient that a cohort was the right sort of size to provide a firefighting unit; possibly military experience had shown the way (cf. 7.9.7 below). It was also convenient that the century could be expected to master a fire in its early stages.

This does not entirely explain why seven cohorts, 3,500 men, were required. This is related to the number of fires which might be expected to occur simultaneously, and is discussed at 7.10.6.

4.28.1

Although the Vigiles actually lived in castra and must have based their patrols on them, they also operated from excubitoria. There were fourteen of these in Rome, two to each cohort, and one in each of the Regions (see 7.10.3). The name 'excubitorium' is our best evidence for the function of these additional buildings: they were places where the men stayed awake at night, in other words, they were watch-houses and convenient places to serve as additional depots for the patrols and firefighting. The only excubitorium which has survived and been identified appears to have started life as an ordinary house (6.2.7), and it would appear that no special form of building was required.

Many of the graffiti from this excubitorium concern the sebaciaria (on which please see 4.31). None of them tells us specifically how the rota for duties at the excubitorium was worked out, but there is a strong implication that the monthly rotation of the sebaciaria duty coincided with the duty of the century at the excubitorium. If this is the case, there is no convenient way by which to tie this duty in with the visits to Ostia.

4.28.2

It should also be noted that the Vigiles are likely to have provided attendants for public shows and public buildings. One graffito from the excubitorium in Trastevere (Region XIV) refers to "cohor(tis) Vigul(um) Niiron(ianorum)" and also to "tiirmis Niir(onianis)" (VI.3052), but this cannot be taken as evidence for any specific place of duty (BR is right to be cautious, p.57).

4.29.1

The Vigiles sent a vexillation to Ostia. The castra of this vexillation have provided us with epigraphic evidence (official dedications and private commemorations) which tells us the essentials of the organisation. The building itself is quite informative, notably in providing evidence to confirm the suggestion that in A.D.205 the corps (i.e. including the vexillation) was doubled in size (6.3.8: confirming 3.11.3 and 5.2.1). For the archaeological discoveries please see 6.3.

The main points regarding the vexillation have been established by BR (pp.107-114). I differ from BR in interpreting the history of the building itself (see 6.3.5ff), but his account of the organisation and history of the vexillation is largely acceptable. Some points can be amplified.

4.29.2

Four centurions are described as "agentibus" at the time of the dedication to Gordian (XIV.4397, A.D.239). This is our best evidence that the vexillation consisted of four centuries. Confirmation that this was the size at an earlier stage comes from XIV.4500, which lists four centurions (A.D.168). The centuries were composite, with men detached from their own centuries serving, sometimes, under centurions who did not belong to their own cohort (XIV.4500, 4501, 4503). Whether there was a consistent pattern in the formation of these centuries is not known. Two other vexillations of a somewhat similar composite nature are known: a vexillation from legio III Augusta consisted of one whole cohort and four men from each of the other centuries (VIII.2532, 18042: Dessau 2487, 9133-9135a); and another vexillation included one man drawn from each century of two legions providing men (III.6627, cf. 14147: Dessau 2487).

4.29.3

Although the praefectus vigilum is often mentioned on inscriptions, it is in fact the subpraefectus who more often played an active part in the dedications ('curare'), along with a tribune as praepositus vexillationis. The first mention of the subprefect at Ostia belongs to A.D.168 (XIV.4500), from which time he is mentioned regularly (XIV.4500, 4502, 4503, 4385, 4509, 4378 - taking us to A.D.190), but none of these cases shows his personal involvement. The subprefect is first attested actually at Ostia in A.D.207 (XIV.4381, 4386, 4387) and he appears subsequently (XIV.4393 - A.D.217; XIV.4397 - A.D. 239). It would appear, then, that the subprefect acquired his special duties at Ostia in the period 190-207. It is tempting to associate this change with the enlargement of the castra and the increase in numbers.

4.29.4

The post of *praepositus vexillationis* also shows some development. It is first recorded for us in A.D. 195 (XIV.4380), and then, as in all subsequent appearances, there is no other tribune mentioned. Prior to references to the *praepositus*, we find ordinary tribunes mentioned, in one case as many as four (XIV.4500). In this, and other cases where a plurality of tribunes are mentioned, the choice lies between the tribunes of the men's own cohort in Rome, and successive tribunes in charge at Ostia. BR favours the latter, and in that case it follows that the ordinary tribunes took charge for shorter periods than did the *praepositus* subsequently; only one *praepositus* per vexillation is recorded. The *praepositus* was one of the ordinary tribunes detached for the purpose from his own cohort (XIV. 4381, 4386, 4387 - all the same man; 4388; 4397).

4.29.5

Of ranks below centurion, the following are attested:

optio	XIV.4500, 4501, 4502, 4503
tesserarius	XIV. 4509
cornicularius tribuni	XIV.4397
bucinator	XIV. 4526a, ?b
beneficiarius praefecti	XIV.226, 4281
secutor tribuni	XIV.4509
an *adiutor*	XIV.4378

There were evidently men detached to perform the specialist duties. XIV.4509 records the *tesserarius* along with the centurion and the tribunes, and the absence of the *optio* implies that the *tesserarius* was taking his place.

4.29.6

A graffito survives which shows that the sebaciaria took place at Ostia as well as at Rome: XIV.4530, which includes the word "sebarius". For details of the sebaciaria, please see 4.31. An exactus later [?nar] um may have been connected with the sebaciaria (XIV.4527d).

4.29.7

The vexillation changed three times a year, on the Ides of April, August and December (XIV.4386; 4499, 4501, 4502, 4503, 4506; 4500, 4505, 4515). Depending on how evenly the duty was spread throughout the Vigiles, an individual might expect to serve at Ostia once every two to five years; in an average career of six years (see 5.2.5) this would amount to two to four occasions.

There is no evidence for provision for continuity. With the infrequent visits by the men, there would certainly have been a period of reduced inefficiency at the start of each new tour of duty, until the new vexillation could find its way around easily at night and had become acquainted with the individual fire hazards and remedies. At worst, a vexillation might have half its members recently recruited and the other half not having visited Ostia for five years. The centurions might have provided continuity, and one possibility would have been to have centurions permenently at Ostia, without any century of their own in Rome itself (on the analogy of legionary centurions nominally attached to a legion but serving away for long periods at a governor's headquarters, for example: the supernumerary centurions of the third century A.D.) Of this, however, there is no sign. Nor, as we have noted, can any pattern be discerned in the selection of men to serve in the vexillation. But this may be an indication that some care was taken: a rigid selection of one man or four men from each century could have produced bad

results. At a slightly higher level, it is interesting to note that the centurion could have his own optio with him (XIV.4503). The effect of drawing men from different centuries at all levels up to and including the tribunes was to spread the burden as evenly as possible among the units remaining in the City of Rome.

4.29.8

The evidence for a vexillation at Portus consists of the group of inscriptions XIV.6, 13, 14, 15 and 231, and the word "castra" on XIV.231, all these inscriptions having been found in a building at Portus (see 6.4.1).

This was probably part of the Ostian vexillation. Cassius Ligus appears on both XIV.4380(from Ostia) and XIV.13 (from Portus), and in the former is named as praepositus vexillationis. In addition, the four (?) centurions mentioned in XIV.13 are probably the same four centurions who would be named on inscriptions from Ostia itself, only two of them, say, being actually at Portus.

The division of the vexillation into two parts, one one each side of the river, was a sensible precaution, since the river can only have hindered mobility. Moreover, the port would have required its own fire patrols. The station at Portus was a castra, as opposed to a mere excubitorium, to avoid the need to cross the river twice a day. The praepositus probably kept his headquarters at Ostia simply because that was the earlier station (6.4.2). There is no evidence for an excubitorium at Ostia or Portus.

If it is accepted that the vexillation was stationed in two castra, an architectural difficulty is removed: the Ostian castra does not need to house

up to 600 men, and there is no need to postulate an implausibly high building in reconstructing the *castra* (cf. 6.7.1).

The stationing of the *praepositus* at Ostia, as suggested, may be paralleled by the stationing of the *procurator portus utriusque* (or *procurator annonae Ostiae et in portu*), who appears to have had duties in both Ostia and Portus and was stationed, to judge from the findspot of most of the inscriptions recording him, in Ostia. (For the evidence for this official see Meiggs 1960, 299f. Meiggs concludes that there were two officials, but the two titles quoted above imply that for some at least of the time one official covered both sides of the river.)

4.30.1

The evidence for the *Vigiles*' firefighting does not tell us much about the actual structure of command and responsibility (as opposed to the formal structure, which was much like that used in the other branches of the Roman army). Clearly the centurions, *optiones* and *tesserarii* played an important part, but it is necessary to wait until we have analysed the career structure before we can see precisely where the equivalent of the modern professional fireman could develop: to anticipate again the conclusion in section 5.2.5 that the normal period of service was six years, the arrangements in the *Vigiles* must have differed in practice from those in the rest of the army, simply because the average career lasted only about a quarter of the time. Again, in order to see what part the tribunes, the sub-prefect and the prefect could play in the firefighting operations, we have to wait until we have seen the sort of experience which these men brought to the *Vigiles*.

4.31.1

Before we turn to these further matters, there remains the sebaciaria, which is best dealt with along with the other evidence for operational matters.

The sebaciaria was an obscure duty performed by rankers and attested in the graffiti which survived in the excubitorium in Trastevere (for the archaeological discoveries made at this excubitorium see section 6.2.7). Most of the graffiti have been published in CIL (VI.2998 to 3091 and 32751), the three remaining being quoted below (at 6.2.7). Altogether 63 of these graffiti refer explicitly to sebaciaria.

The typical form of the graffiti is:

name SEBACIARIA FECIT MENSE name of month

usually with the man's century indicated, and often followed by a phrase to indicate that all was well ('OMNIA TVTA') or that the man's commanipuli were safe ('SALVIS COMMANIPVLIS').

4.31.2

Normally the duty was performed by one man on his own. This is shown both by the form of the graffiti, with one man usually being named as sebaciarius for the month, and also by the following phrases:

"...sabaciarius mese suo ..." (3053)

"...sebacaria fecit m(ense) Aprile in loco Sucessi" (3066)

"...sebaciaria fecit mense Maio nomine Claudii Nati ..." (3076)

"7 Felicis Fufius Getulicus dicit lassus sum successore [m date]" (3072, almost certainly referring to the sebaciaria)

"...sebaciaria fecit m[ense ?] (centuria) Victoris comanip [ulo] Vabio permitent[a]" (3068)

One graffito shows the sebaciarius being assisted by another man (3060):

"...sebaciari secit mese Decenbre cum Aelio Apodemo comanpulo"

and another (3078) may possibly reveal (or perhaps conceal) an adiutor

(if this is not a different sort of adiutor):

"...sabaciaria [fecit]tonio Aegn[ ]utore t(?) adiu [tore ...."

Finally, 3046 shows that one man started the sebariaria and that a different man completed it:

"Felix f(ecit) s(ebaciaria) Caecilius Felix sebarius perfecit"

4.31.3

The rota changed on the first day of the month, and was performed every month of the year. 3062 and 3069 show the starting day:

"...sevaciaria fecit ex Kalendas Iulias in Ka(lendas) Augu(stas)..."

"...K(alendis) Iunis Celius Saturninus sebariaria fecit ..."

The months are attested by the graffiti indicated below:

January	3006, 3056
February	2998, 3002
March	3008, 3028, 3032, 3058, 3067, 3087
April	3023, 3066
May	3004, 3013, 3039, 3057, 3076
June	3003, 3010, 3069
July	2999, 3000, 3012, 3015, 3020, 3062, 3063, 3080
August	3001, 3019, 3079
September	3033, 3064
October	3005
November	3054, 3065
December	3011, 3060, 3088

In addition 3029 and 3081 originally named the month concerned though this is now erased.

4.31.4

The sebaciarius performed the duty in or on behalf of his century, about 47 of the graffiti identifying the century by the name of the centurion in the usual way. There is also a single reference to a whole century apparently taking some action (3045, discussed below), and in a few cases we hear of the optio and in one case of the tesserarius standing in for the centurion (above, 4.30). It is probably that these officers had nothing specific to do in connection with the sebaciaria but were just generally in charge. If more than one century were on duty at the excubitorium it would presumably follow that there was more than one sebaciarius, but this is unlikely to have been the case (above, 4.31.2).

4.31.5

The direct evidence for the nature of the sebaciaria is very scanty. There is also the point that by their nature any of these graffiti might be humorous rather than documentary, in which case the joke might turn out to be on the historian. However, the examination is worth attempting, and the following are the items which we should not ignore.

1) The word 'sebaciaria' itself, with its variants, including 'sebaciarius'. The reference is clearly to lighting, specifically to tallow candles.

2) References to other lights and to oil:

AD LVCIRn////AII///////OiEVM P N VOT XX . C
AD LVCINI V X ALNINO ET MAXIMO COS (3019)

COH VII VIG GORDIANI.D.N
7 MARCELLIANI EGRILLI RVFINIANI
SVBACIARIAM TVtA FECIT

OLEV CVR AVRELIVM AGRIPINVM OPTIONE

SEBACIA

LVCINIVM

LVCERNAS

AD PORTA

AD POMPAS (3038)

The following should probably be placed with the two preceding since it mentions oil:

7 PATROILI
Q GNINVS MILE
OLEVM IN CALIGAS SABACIARIVS MESE SVO OMNIA TVTA SINE QVERELLA

(3053)

3) The phrase '<u>fysgo suo</u>'

COH. VII VIGVLVM . CENTVR

IAM . CRISPINI SEBACIARIA . FE

MESIS . MARTIV AVFIDVS . SECVA

NVS . FYSGO SVO

FIILICISIME INTECRE (3067)

4) A horseman in the century (3045):

S . IVLI AEMILIANVS 7 SEBACIARIVS . CENTVRIA EQVES FACTVS

Mommsen did not favour the idea of there being horsemen in the <u>Vigiles</u> and suggested (CIL,n.) that the reading should perhaps be:

"(centuria)Iuli Aemilianus (centuriae) sebaciarius centuriae qu(i) es(t) factus"

There is, however, a second piece of evidence that horsemen should not be ruled out, and this is a picture of a man on a horse which is drawn in outline among the graffiti. This picture is not referred to in CIL, but it is clear enough on Parker's photograph. Unfortunately it is so mixed up with the graffiti, and these are so squashed together, that is is impossible to see whether the picture belongs with any of the graffiti. Its presence lends a certain amount of confidence that the text of 3045 should be allowed to stand, and that a horseman had something to do in connection with the sebaciaria. 3045 would imply that the sebaciarius and the horseman were one and the same.

5) The conclusion of many of the graffiti recording that all was well: for example, OMNIA TVTA, FELICITER,
and, recording the safety of the companions of the sebaciarius,
SALVIS COMMANIPVLIS.

6) The references to votes and vows, as in 3019 (quoted above), or in 2999 and 2998 which have these references set out more elaborately in panels to either side of the main text.

7) Two references to the start of the fourth year of service (i.e. the 1st of March following the first three stipendia):

COH.VII.VIG SEVERIANA 7 FAVENti
NI IVLIVS SATVRNINVS FECIT SE
BACIARIA MENSE AVGVSTo FVSCo
II ET DEXTRO COS SVB CR///// SEVERINO
//////// OPTIONE OMNIVM
FELICITer COMEAT STIPENDIOR
VM TRIVM I MARTIAS . TR S (3001)

GAZER II M E SEBACIARIVM
7 ARRIANI.IVL.M///
SEBACIARIA fecit M.DEc
////// accepto COMMEATV
STIPENDIORUM III (3011)

8) Two references to 'emituliarius' :

COH VII VIG ANTONINIANA 7 SECVNDI
IMP ANTONINO AVG II ET SACERDOTEM COS I OPTIO 7 TITANVS
FLAVIVS ROGATIANVS MIL COH ET 7 S S
SEBACIARIA FECIT MEN MAI
SCRIPSI IIII KAL IVNIAS TVTA
AGO GRATIAS EMITVLIARIO (3057)

CHO
VII VIG
IMP M AVRELI
O SEVERO ALEXAN
DRO COS
OPTIONE P NVMISI
O NEPOTE 7 ADIVTO
RE POMPEIO CELSO 7 VOT XX
7 AVRELIO HERCVLA
VOT XX NO RVBRIVS DEXTER
SEBACIARIA FECIT MEN
SE MAIO NOMINE
CLAVDII
NATI
OMNIA TVTA
SALVO EMITVLIARIO
FELICITER (3076)

4.31.6

BR (pp.103-107) sets out briefly the various suggestions put forward to explain the sebaciaria, himself emphasising that the various phrases 'omnia tuta', 'salvis commanipulis' and 'feliciter' should imply that there was some danger in connection with the duty. Conjecturing that the sebaciarius was the man who carried a torch at the head of the patrols, BR suggested that "the particular purpose in question was some night duty of considerable danger, of more danger perhaps to the lantern-bearer, from his exposed position, than to the rest of the force. What this duty was I prefer to leave unspecified". The only circumstances in which the lantern-bearer would have been in greater danger than the others in the patrol would have been when the patrol was likely to be shot at or otherwise intercepted: in firefighting, we should not assume that he was in greater danger than the others, whether from being run over by nocturnal traffic or by marching first into a fire; on the contrary, he should have been safer. Probably it is best not to start by assuming that the sebaciarius was in some sort of "police" patrol. The opinions of the other scholars cited by BR need not be rehearsed in detail, since they all have the generic fault that they concentrate on just parts of the evidence to the exclusion of the rest. Let us first, then, look at the evidence in detail.

1) 'sebaciaria' and 'sebaciarius' do not present any difficulty as regards the basic meaning of the words. Basically referring to tallow candles, the ending '-arius' should bear its usual significance, 'one who is concerned with the making or use of'.
The word 'sebaciaria' is interesting, since in the neuter plural it probably refers to the particular activity of the sebaciarius, being used in the phrase 'sebaciaria fecit' (i.e. different from

'sebacea fecit', which does not occur in these graffiti).
More than simply producing candles is involved.

2) The other references to light, this time using oil, are interesting because we may see a little of the functions of the sebaciarius. 3019 indicates the use of two types of lamp (possibly the distinction is simply of size), and 3038 appears to show where the lamps were placed or (metaphorically) their function.

'ad porta' must mean 'at the door', and probably refers to the main entrance; in this connection the discovery of a lamp in the form of a flame near the entrance to the excubitorium is of great interest (below, 6.2.7), though it must unfortunately remain a conjecture whether this was a precursor of the modern red lamp and the particular lamp referred to in the graffito. 'ad pompas' is more difficult. 'pompa', like 'πομπή', most commonly means a public procession, and its other attested meanings are connected with this or derive from it; πομπή is used to indicate a Roman triumph. Metaphorically, it probably would be possible for pompa to refer to the patrols, and so for the graffito to refer to lamps for the patrols to carry; on the other hand, 'ad porta' in the line just above it does seem extremely literal. Moreover, although any venture into the interpretation of colloquial Latin must be attended with caution, it is worth exploring the possibility that 'pompa' here might mean 'pump'. The problem is that this sense is not attested in any classical writings. There is not much to help us if we try to work back from the modern use of the word. According to many of the dictionaries of the first part of the nineteenth century, the Italian 'pompa' was borrowed from French mariners' slang, and there

is agreement that, in whichever language the word first appeared, it was onomatopoeic and slang used by sailors. The corollary of this is that until the compilers of these dictionaries started to include mariners' slang, the word went unnoticed. It did not, however, not exist, for Du Cange (s.v.) cites what is probably the first attested occurrence of the word in the sense of pump, in the Necrologium of the Abbey of Daoulas (in the diocese of Quimperle, Finistere), unfortunately without giving a date, though the abbey was only founded in the eleventh century:

"Partem domus restauravit, quae respicit ad Pompam, et unum villagium."

Just as useful, not least because its date is known, is the occurrence of the word 'bombare' meaning to pump, in a poem (in Italian) by Erasmo di Valvasone, Caccia 3.145, dated to 1593. This is probably as far as we can go, since the linguistic complications overtake us, but for present purposes two points may perhaps be made:

(a) the meaning 'pump' makes very good sense

(b) Roman pumps would have made a sound for which 'pompa' would have been an appropriate representation, and as yet only the Vigiles among the ancient users of pumps have provided us with any suggestion as to what they might have called the pumps when they were not using the more sophisticated terminology.

As to why the Vigiles were placing lamps by the pumps (assuming that this is the interpretation which makes better sense), we must wait until we have gone through the remaining evidence.

3) Both 3053 and 3067 are of interest because they reveal a little of the personal side of the duty. 3053 records that the oil was distributed among the soldiers ('in caligas') without complaint. Does this mean that sometimes the oil was distributed inequitably? 3067 is straightforward except for the odd phrase 'fysco suo'. BR rightly notes that this is an extremely odd form if 'fisco suo' was intended, and "it is doubtful if fisco suo could be used for sua pecunia" (p.105). One alternative possibility exists: that 'fysco' is a latinisation of 'φυσκών', which in Pollux 7.205 means a throw of dice. If this hypothesis be accepted, the phrase 'fysco suo' would tell us that the vigiles arranged their rota by lot, and that Aufidus Secuanus performed his duty at the time so allotted. In this case, it becomes impossible to follow Henzen in assuming that the sebaciarius paid for the illuminations at his own expense (BR p.105), and we cannot put forward what would otherwise have been an attractive explanation for 'sine querella' that if the sebaciarius was short of money some of the vigiles went short of oil.

4) There is no practical reason why just one of the firemen should not have used a horse. It would have been very practical for the patrol to have been preceded by a light, both for seeing where they were going and also for ease of re-assembly in case of fire. If, as 3072 implies (quoted above), the sebaciarius was liable to become fatigued (i.e. by carrying a large light) it would have been sensible to mount him on a horse, though this would not have removed all of the exertion. A supply of emergency flares could also have been carried by the horse, and, in the event of a fire, the horseman could have deposited most of his flares for the firefighters to use, and returned to the fire station fixing flares at crucial points on buildings to guide the reinforcements. In this way, the horse will have been used as a bicycle, the extra height removing the need to carry a ladder.

5) The references to safety and danger are not a great deal of help in suggesting what the sebaciaria consisted of, since practically any activity in Rome at night had its dangers, and, allowing for superstition, the night itself will have presented a danger.

6) The references to votes and vows, as BR saw (p.104), occur in so many months and years as to suggest that they do not refer to public celebrations; possibly they were connected directly with the sebaciaria.

7) Henzen suggested on the strength of 3001 that the sebaciaria were illuminations held by the vigiles when they completed three years' service (Bull.Com. 1867, 12-30). BR is probably a little over-critical when he comments (p.105): "this explained nothing but the remark upon which it was based." While admitting the difficulties caused by the lack of evidence, we cannot overlook the words in the graffito. Even if we do not go so far as to believe that the sebaciaria was purely a celebration, there is no inherent reason why the sebaciaria should not have been restricted to the more senior men..

8) The word 'emituliarius' occurs only in 3057 and 3076. In the former, it is in different letting from the remainder of the graffite, though the first part of the clause in which it occurs would appear to be in the same lettering as the rest of text, and we may take it that it did form an original part of a single graffito. 3076 does not present any textual difficulties (only Visconti has a variant reading: O....VARIO, where all the other editors read EMITVLIARIO).

BR summarises the various suggestions concerning the meaning of the word (pp.92f., with references), and these need be noted only briefly:- "bucket

man" (from hama, tulo), "mattress for jumping on" (from tritolium or emitolium), "bed-fellow" (from the same derivation as the last), "the man who bears half the burden of the sebaciaria", the "artificer who was responsible for the lamp-brackets in the streets", "a man armed with a club half-studded with iron" (from ἡμι τυλωτός), "the man who bought provisions" (from emere), and BR's own contribution:

> "No one seems yet to have suggested that it may be a proper name.
>
> Personally I do not find any of these explanations satisfying, and until further evidence comes to light I am content to take it as some technical post, possibly of a temporary nature, and to admit that we have no idea of its derivation or signification."

Certainly the cautious approach is the right one for such an obscure word, and since both the Thesaurus and also Liddell and Scott (s.vv) are non-committal as to its meaning we should perhaps devote a little attention to the context in which the word is used. In the one case the emitulfarius is being thanked, while in the other he has been preserved. It seems to me that we should not consider emituliarius to be an official or semi-official designation at all, but rather take it to be an obscene reference to someone who was in a position to play an important part (and perhaps failed to do so) and who was regarded as valuable (though possibly only by himself): perhaps the centurion? These are, after all, graffiti. Whether or not this suggestion is acceptable, we should certainly reject the hypotheses which fail to consider the context and rely solely on guesses at the etymology of the word.

4.31.7

Probably the best explanation of the sebaciarius is that he performed a job which was not in itself difficult or specialised, that of heading the patrol with a light and with a supply of emergency lights, and of attending to the lighting of the fire stations. It was more a matter of being well-organised.

With the night being a period for the superstitious to become afraid and to try to avert evil, it would not be surprising if the sebaciarius thus became in some sense a guardian of the safety of the men, since he was in charge of lighting, and so came to have a ritual or ceremonial function in addition to his primary job. Such an explanation would satisfy the references to lights, horsemen, safety, votes and vows.

It would also account for the appointment by lot of the sebaciarii, if the post carried a certain ceremonial standing, and, indeed, would explain the reference to the emituliarii (assuming that the centurion is intended) on the ground that the sebaciarius led the patrol rather better than the officer-in-charge. For a post of this standing, it would be natural to restrict it to men with longer service and of the standing to be recipients of frumentum publicum after three full years' service.

The post of sebaciarius does not appear anywhere except in graffiti. Officially it was probably regarded more as a duty than a post, but the regular organisation of the duty seems to have led to its being treated as a regular post, at least among the rankers.

4.32.1

This examination of the evidence for the equipment and techniques of the Vigiles shows us the material resources available for firefighting. We now

go on to examine other factors, to enable us to see how effectively the Vigiles could operate.

Two points stand out. First, the lack of hoses restricted the capabilities of the pumps, even if these themselves were large. Second, the lack of equipment capable of extinguishing a largish fire was not really a disadvantage, provided that the Vigiles could tackle a fire in its very early stages. Overall, the most important potential of the Vigiles lay in their numbers. As long as the patrols were effective in discovering fires, there was no reason why the Vigiles should not be very successful. Most fires today are put out with the simplest of equipment; the Vigiles had to aim to do likewise.

CHAPTER 5

PERSONNEL

5.1.1

The use of manpower has two aspects which are considered separately in this thesis: in Chapters 4,6 and 7 we look at the functional aspects, with firefighting taking the major place (in Chapter 4); and in this present Chapter we look at the management aspects - terms of service, personnel structure, and nature of career. The framework is provided by the analysis of VI.1057 and 1058 in Chapter 3.

5.1.2

Broadly the Vigiles were organised in the same way as the rest of the Roman army. This means that they differ from some fire brigades of the present day in that they did not have either a clear-cut officer-entry system or a simple system of promotion from the ranks, though fairly close parallels may be found on the Continent. This is not to say that the Vigiles had diverged from some ideal standard, but the difference does lend considerable interest to the structure of the corps. In particular, we have to look carefully to find the areas in which the equivalent of the modern professional fireman could develop. The evidence, by and large, tells us more about the system than about individuals within it, so that we have to leave the answer to the question more in terms of potential which the system offered, and suggest that realisation of the potential was as extensive as we judge the Vigiles to have been successful.

5.1.3

We start off by looking at the rankers (5.2), followed by the immunes and principales (two groups who between them comprised the nco's and technicians), who were drawn from and largely remained within the ranks (5.3). Then we look at the higher officers: centurions (5.4), tribunes (5.5), the sub-prefect (5.6) and the prefect (5.7). Finally, we look at the corps as a whole (5.8).

5.2.1

The only direct evidence for the size of the cohorts and centuries is the pair of lists of the Fifth Cohort (VI.1057 and 1058) which are largely the subject of Chapter 3. 1057, datable to A.D.205 (see 5.2.5), contains 917 men, while 1058, of A.D. 210, contains an estimated 1027 (3.2.6;3.2.7). They may thus be reckoned to have been milliary. The seven centuries varied greatly in size, the smallest in each year being 93 and 85 respectively and the largest 167 and 178 (3.2.7): the average numbers are 131 and 147 in each year. VI.1056, in the same series of inscriptions, has had the lists of three of the centuries of the First Cohort removed, but the remaining four centuries are of similar size (3.11.3), with an average based on the four centuries of 122. Although the point has never been fully argued, different scholars have taken different views of the size of the cohorts when they were first established, in A.D.6 (for the date, Dio 55,26). E.Birley (1969,64f) took the view that Severus was responsible for increasing the size of the cohorts from 3,500 to 7,000, though he does not cite any evidence for this; Watson (1971,19) again without discussion, assumed that the Vigiles always numbered 7,000. There are two points which support the Birley view. First, in A.D.6 all

cohorts were quingenary: the milliary unit does not appear for several decades (probably not before the Flavian period: E. Birley 1966,55); hence the seven new cohorts should also have been quingenary. Second, unknown to either of the two scholars in 1969 and 1971, the lists of the Fifth Cohort imply that in A.D.205 that cohort was doubled in size. The precise basis for this statement is set out at 3.11.3, where the recruits of 205 on 1057 are given as percentages of the total number in the unit. For each century, they are as follows:

53.125%

52.695%

50.413%

45.217%

58.042%

70.339%

47.312%

The average percentage is thus 53.878%. Such a situation is clearly exceptional, otherwise the units would have continued to increase ad infinitum from minute origins. In 205 the new intake must have doubled the size of the centuries and of the cohort. In view of the increases attested for the Praetorians and the Urban cohorts (see Birley 1969, 64 for references) this increase in the Vigiles must have been intended to keep them in line with the other City troops. From a firefighting point of view, there is no particular reason for the Vigiles to have been increased in 205, nor even at that general period; the effect on firefighting and the patrols must have been incidental. The need for increased accommodation may be seen in the castra at Ostia, which was enlarged by Severus precisely in A.D.205 (6.3.8); there must also have been a huge increase in the amount of paperwork in the administration.

It is noteworthy that the increase was performed quite crudely, since the effect of taking in a number of recruits approximately equal to the existing number of men was to create a 'bulge' which would take some years to pass through. Even if recruitment were cut down for a few years (and the variation in the size of the centuries may reflect such an action), the cohorts were bound to be oversize for a time, and this would explain why in 210 there were 90 men more in the Fifth Cohort than there had been in 205. For an unknown reason, the smallest century, no.7, received the smallest number of recruits in 205.

Clearly the centuries varied in size even before 205. In general, they would seem to have consisted of 60 to 80 men. For the rates of recruitment, it is estimated that after the doubling in size in 205, the annual rate will normally have been in the region of 20 to 30 men per century (3.10.2), and before 205 the rate was presumably about half that amount: and, consistent with this, VI.220, which lists the recruits of one year (A.D.199-200: see below, 5.2.8) who survived until 203, shows 16 names.

5.2.2

The establishment of the Vigiles by Augustus in A.D.6 is described in some detail by Dio (55, 26 and 31):

> "When many parts of the city were at this time destroyed by a fire, he organised a company of freedmen in seven divisions, to render assistance on such occasions, and appointed a knight in command over them, expecting to disband them in a short time. He did not do so, however; for he found by experience that the aid they gave was most valuable and necessary, and so retained them. These night-watchmen exist to the

present day, as a special corps, one might say, recruited no longer from the freedmen only, but from the other classes as well. They have barracks in the city and draw pay from the public treasury."

"And as there was need of more money for the wars and for the support of the night-watchmen, he introduced the tax of two per cent. on the sale of slaves".

Suetonius commented on the unusual step in employing freedmen (Aug.25):

"Libertino milite, praeterquam Romae incendiorum causa et si tumultus in graviore annona metueretur, bis usus est."

In both these other cases, he tells us, the freedmen were former slaves who had been specially liberated; and the same might have applied to the original Vigiles, recruited perhaps from the familia publica set up for firefighting in 22 B.C. under the charge of the aediles (Dio 54.2), and transferred in 7 B.C. to the vicomagistri (Dio 55.8).

Two reasons may be suggested for the positive choice of freedmen for this new corps, and four reasons for not choosing any other class. On the negative side, there were probably too few Roman citizens who would be willing and able to serve, bearing in mind the aftermath of the civil wars and subsequent wars; it was in the interests of Augustus to make the new corps look as non-military as was practically possible, and freedmen were normally barred from military service; thirdly, to have used slaves on such a scale would have invited insurrection; and fourthly, the collegia were in bad odour, and, while they might act as firemen in smaller cities, in Rome the scale of the operations would have given them too much importance had they been given firefighting duties. Moreover, the collegia would probably not have been well-suited to performing night-duties. On the positive side, freedmen were available in large numbers in Rome, and as a

class they enjoyed wide experience of practical occupations which would make them suitable for firemen.

There is epigraphic confirmation of Dio's statement that other classes than freedmen came to serve in the Vigiles. It is often impossible to deduce the status of a man who displays simply the tria nomina, but in the following cases we have explicit statements that the man in question was a libertus (indicated by 'L' in his name), or an ingenuus Roman citizen (indicated by the filiation 'F' in his name), while the others were presumably peregrini or citizens by special grant (where, in a list in which some men give 'L' or 'F', others give nothing, and so presumably were neither freedmen nor citizens by birth). The numbers in each class are given.

Inscription	Date	Status		Other
		Freedmen	Ingenui	
XIV.4499 (=AE.1912,230)	166	1	2	8
XIV.4500	168	4	4	0
XIV.4502	175	2	3	0
XIV.4503	181	2	5	0
XIV.4505	282-3	0	7	0
VI.220	recruits of 199 and 200	5	11	0
XIV.4378	?	0	0	3
XIV.4509	?	0	0	3
XIV.4506	?	1	0	0
XIV.4508	?	1	0	0

Clearly, this evidence confirms the trend, though it is not possible to work out precise proportions of each class. Status does not appear to have been a major source of advantage or disadvantage in recruiting to the Vigiles.

5.2.3

The question whether the Vigiles were properly soldiers (milites) is one which is closely bound up with the standing of the corps. At the outset, Strabo called them "στρατιωτικον" (5.3.7) but Tacitus omitted them from his list of the armies under Tiberius (Ann. 4.5 ; A.D.23), suggesting that at that date, even if not in his own time, they were not reckoned to be military. However, there is only one source which even implies that there might have been a problem, and that was solved by Ulpian (Dig. 37.13.1):

"in classibus omnes remiges et nautae milites sunt; item Vigiles milites sunt, et iure militari eso testari posse nulla dubitatio est."

BR comments on this passage (p.66): "But the very fact that there can have been any question on the subject shows that the position of the Vigiles was not so certain and well known as that of the other troops, and probably also that at one time their status was different." Surely it was well known that the Vigiles were different; and, if so, the question will have been provoked by this difference. The solution followed the normal pattern, in that existing military practice was adopted. It seems best to regard the Vigiles as a unique corps, but one which made full use of military analogies and arrangements when they were helpful. Not merely did this extend to the organisation of the Vigiles, in cohortes and centuriae, but the centurions, tribunes, sub-prefects and prefects came to serve in the Vigiles, as they went to serve in other types of unit in the course of their careers.

Further, the nature of the duties and the service were such as to demand the use of normal military vocabulary and detailed arrangements. Hence we find the use of "miles factus" (for example on VI.222 and XIV.4509), the name "miles" on tombstones (e.g. VI.2960, 2962b, 2964), together with the verb "militavit", and, in the Lex Visellia of A.D.24 (i.e. only eighteen years after the Vigiles were established) we again find the verb "militaverit" (see 5.2.4). Many of the immunes and principales have the same titles as are found in other types of unit; there was an established period of service (legitima stipendia), and the possibility of honesta missio, just as for other troops (see 5.2.5); some even called themselves veterani (5.2.6). All this evidence indicates that in practice the Vigiles were treated like soldiers, and that it was only in certain legal aspects that any problem arose. However, as BR rightly notes, there always was felt to be a difference,and we should beware of assuming that there was a gradual rise in status until the Vigiles were regarded as proper soldiers; the major move towards parity of status will have come with the constitutio Antoniniana (A.D.212-214), which extended Roman citizenship to most of the free people in the Empire (though without ending the production of freedmen subsequently: Jones 1960,133f.).

5.2.4

Although the Vigiles were established as a corps of freedmen into which peregrini and even citizens by birth were admitted, there was one class which was admitted but which provoked special arrangements applicable only to itself. These were the Latini Juniani. In a sense, they were a special type of freedmen, distinguished by having been manumitted informally, but the informal manumission did not of itself confer the status of Roman citizen, and there were other disadvantages also.

Before it is possible to discuss the Junian Latins in the Vigiles, it is necessary to refer briefly to the thorny question of the date of the lex Iunia Norbana. This was the law which created the class of Latini from those who had been manumitted informally (Gaius Inst. iii.56):

> "eos qui nunc Latini Juniani dicuntur olim ex iure Quiritum servos fuisse, sed auxilio praetoris in libertatis forma servari solitos. . . postea vero per legem Juniam eos omnes, quos praetor in libertate tuebatur, liberos esse coepisse et appellatos esse Latinos Junianos".

The question of the date hinges on whether to rely on the consular date of A.D.19 given in its title by Just. Inst. 1.5.3, the only source which gives an identifiable date.

The arguments for and against acceptance of A.D.19 are set out by Crook (1967, 44 and 296 n.29), and by Last (C.A.H. vol.X, 888ff.). Last's objection to A.D.19 arises from consideration of the relation of the lex Iunia Norbana to the lex Aelia Sentia of A.D.4, and he finds strong grounds in certain passages for supposing that the lex Iunia Norbana was the earlier. On the other hand, he admits "it must be plainly stated that the meaning of these texts is not beyond dispute. Even though such an interpretation is not perhaps the most natural, if demonstrative proof were forthcoming from some other quarter that the lex Junia was a later measure than the Lex Aelia Sentia, they could be interpreted without great difficulty to accord with the version of the social legislation which would then be imperative." Last then refers to A. Steinwenter in P.W. XII, cols. 910 sqq., for such a treatment. However, while it is true that the title of the law occurs in our sources only once, it is unnecessary to dismiss that passage (Just. Inst. 1.5.3) as "a single text from the sixth century": not all such sixth century texts are wrong.

The value of Crook's discussion is that it asks whether there really is a problem over the date: what is wrong with referring the law to the *consules ordinarii* of A.D.19? Moreover, although this is not the place for further study of this point, it is not impossible that even before the passing of the Lex Junia Norbana there was a class called '*Latini*', who appear as such in the Lex Aelia Sentia. A small contribution to settling the question is provided by the discussion below, in which it is suggested that assigning the law to A.D. 19 helps to explain why it was in A.D. 24 that another reform was needed. In this matter, then, I follow Crook in accepting A.D. 19 as correct.

The date of the Lex Junia Norbana is important, because the *Vigiles*, it may be argued, were established thirteen years before there was such a status as Junian Latin. In A.D.6 there were only two types of *liberti* which we know to have been recognised by law, the *cives Romani libertini* and the *dediticii*, of which only the former will have been eligible for service in the *Vigiles*; also there may have been a class of *Latini* (see preceding paragraph). Since there has grown up a tendency in discussing the *Vigiles* to assume that *Latinus* was synonymous with *libertus*, it is perhaps worth observing the distinctions set out at Just. *Inst.* 1.5.3:

> "Libertinorum autem status tripertitus antea fuerat: nam qui manumittebantur, modo maiorem et iustam libertatem consequebantur et fiebant cives Romani, modo minorem et Latini ex lege Iunia Norbana fiebant, modo inferiorem et fiebant ex lege Aelia Sentia dediticiorum numero."

This passage goes on to outline the development of freedman status, which became simplified though with the addition of many new ways of obtaining *libertas*.

The early presence of Junian Latins in the Vigiles is attested by one of the clauses in the Lex Visellia of A.D. 24 (Ulpian Fr. 3,5):

"Militia ius Quiritum accipit Latinus (si) inter Vigiles Romae sex annos militaverit".

It should be observed that this refers to Latins, not to freedmen in general. The other interpretations which are reviewed briefly below all take this provision to refer to the whole of the corps of Vigiles, not just the Latins.

A summary of the legal attributes of Junian Latins is given by Duff (1928,78ff.). They had the full ius mancipationis but only a restricted ius testamenti factionis: they could witness wills and could exercise tutelae, but they could not make their own will, they could not receive bequests except under the form of fidecommissa, they could not appoint tutores by will, and they could not succeed to an estate over which they exercised tutela. Their own estates passed at their death to the patron (Gaius Inst.3.5;):

"res eorum peculii iure ad patronos pertinere solita est."

Duff concludes "The ius Latinorum, the patronage of Latin freedmen and the right to their estate, was therefore a lucrative possession", and it was this financial interest which largely provoked the legislation concerning Latin freedmen.

The clause of the Lex Visellia quoted above was just one part of a much bigger law, concerned in part with the provision of methods by which rich freedmen might obtain fictional ingenuitas and so proceed to the honours of the free-born (Duff, Appendix II). The clause which would

probably have had the most widespread effect stated that only the emperor could award the right to wear a gold ring and so enable freedmen to hold municipal magistracies and priesthoods (C.J. ix.21):

> "Lex Visellia libertinae condicionis homines persequitur, si ea quae ingenuorum sunt circa honores et dignitates ausi fuerint attemptare vel decurionatum adripere, nisi iure aureorum anulorum impetrato a principe sustentantur."

A further special grant would be needed to confer the equus publicus. The existence of the clause which refers specifically to the Junian Latins serving in the Vigiles suggests that they enlisted in considerable numbers. Before the institution of the grant of citizenship after six years' service, a Latin who had served in the Vigiles could not really call his pay his own: at his death his savings would pass to his patron, and not to his family or any other person he might wish to choose, and a greedy patron might even exert pressure to acquire the money before the man died. The presence of Latins in the Vigiles must have added a considerable burden to the work of the praetor, as well as lowering the dignity of the corps. The solution in the Lex Visellia is, in effect, automatic iteratio (formal repeat of the informal manumission) with the automatic sanction of the emperor (beneficio principis: an alternative to the patron undertaking the ceremony of iteratio cf. Duff 80f.). Duff notes that the consent of the patron would not be required if the freedman had proved "that he had contributed to the welfare of the state and in virtue thereof had a claim to be numbered among its citizens. . . By his service the Latin had merited citizenship; the patron's right to his estate was overridden by the Latin's right to the franchise."

The period of 6 years was one which was already familiar in the context of service by which a man might attain full citizenship. Under the Lex Iulia municipalis (the tabula Heracleensis, 45 B.C.) a citizen might, even if he were under 30 years of age, seek office if he had served for 6 years as a foot-soldier in a legion (I.206 = Dessau 6085, lines 89-94 and 98-103):

> "Quei minor annos natus est erit, nei quis eorum . . . gerito, nisei quei eorum stipendia equo in legione III aut pedestria in legione VI fecerit."

The three-year provision is relevant to the frumentum arrangements of the Vigiles and is discussed below (5.2.8). The six-year provision is clearly a suitable precedent for the citizenship of the Latins in the Vigiles, infantry service in a legion being analogous to service in the Vigiles. In the former case, though, the qualification was for holding office for under-age citizens, in the latter for Latins to become citizens. A little later, Claudius made further use of the six-year period in his arrangements for assisting the corn supply of Rome. In these, citizenship was offered to any Latin who would build a ship of 10,000 modii capacity and help provide corn for Rome for a period of 6 years (Suet. Claudius 19; Gaius Inst. 1.32; Ulpian fr.3,6). Six years, then, was a period which if spent in service to the state could bring the full reward and exercise of citizenship. For the Latins in the Vigiles, it meant liberation from the claims of their patroni. For the majority of the liberti, who already possessed citizenship, the reward was meaningless and not applicable.

This interpretation of the clause in the Lex Visellia differs from earlier ones. The general opinion is given by BR on page 66:

> "It seems that there must have been some difficulty in recruiting for the Vigiles in the first years of their existence; the duties were arduous, the prospects of promotion small, the service probably long, and the reputation of the corps apparently poor. At any rate, in the reign of Tiberius it was found necessary to add some inducement, and in A.D.24 a Lex Visellia was passed by which the men of the Vigiles acquired the full citizenship after six years' service in the corps."

Much of this is open to doubt, and SR also ignores the more general aims of the law. Duff (1928,84) also regards the law as an inducement to recruiting, though he rightly observes that the assistance of the Latins was genuinely needed while wrongly assuming that they were unwilling to serve. Durry (1938, 19) sees the Lex Visellia (again, the whole of it) as "un geste en leur faveur au moment où l'on réunissait les pretoriens dans la caserne neuve du Viminal". Watson (1969,19) considers that the Lex Visellia provided "the first stage in the upward climb of the vigiles towards social respectability", and probably encouraging free-born citizens to join (how?). It should not be forgotten that this clause of the Lex Visellia concerned an anomalous group of men, and that the Vigiles were principally cives Romani when they joined. The majority lacked only ingenuitas.

There is an interesting implication of this interpretation of the clause in the Lex Visellia concerning the Latins in the Vigiles. It is suggested below (5.2.5) that six years was the normal period of service in the Vigiles. Junian Latins were, as we have seen, unable to retain their peculium against the wishes of their patrons, and this disadvantage must have haunted them as long as men of that class were serving in the Vigiles. The question therefore arises why it was not until A.D.24 that their position was improved and they were enabled to keep their savings.

The answer would appear to be found in the date of the Lex Iunia Norbana; before A.D.19 the class of Junian Latins did not exist, and, in law, the problem of their pay did not exist. Starting from A.D. 19, Junian Latins in the Vigiles must have realised that they were liable to lose their savings. As long as they were still serving this would probably have remained a minor worry. Once they left, however, they were vunerable to pressure from their patrons. It therefore becomes interesting that the improvement in their status in A.D.24 would apply to the very first batch of recruits who would have been listed under the new heading of Junian Latins. In A.D.24 they would have been preparing to leave the Vigiles after serving their six years. It is very neat to suppose that the improvement in their position was incorporated in the Lex Visellia because that law was made in the year when the problem would have become major. In other words, if the creation of the class of Junian Latins had taken place earlier than A.D.19, it might be supposed that the reform for those Latins in the Vigiles would have also been made earlier than A.D.24, otherwise they would have been harder to recruit. Thus it would appear that the existence of the clause in the Lex Visellia confirms that the Lex Iunia Norbana should be assigned to A.D.19.

Subsequently, probably when the right to frumentum publicum was awarded to the Vigiles, the special position of the Junian Latins again caused difficulties. The six-year provision seems to have been superseded by one of three years. This change is discussed in the section on frumentum publicum (5.2.8).

5.2.5

The normal period of service in the Vigiles is a matter ofsome difficulty. Analogies with the fleets and the legions led BR (p.65) to

wonder whether it started at 26 years and was reduced to 20; Domaszewski (1908, p.7,n.1) confused his figures and argued that since one third of the names on VI.1057 were missing on 1058, and the interval between these lists was five years, the period of service should have been 16 years ('one third' is corrected by Domaszewski-Dobson 1967, VII to 'two thirds') Thus these lists imply a period nearer to eight years (that is, leaving various factors out of account). Breeze (1970,I,92) partly based his view on the attested stipendia of immunes and principales and assumed a period of 25 years. It has also been suggested to me in discussion that there was not a regular period of service at all!

Vigiles served for a recognised period (the legitima stipendia) followed, normally, by honesta missio (Ulpian Frag.Vat.144; VI.32754; and A.E.1933,87: quoted below in section 5.2.6). The purpose of this section is to consider what the recognised period of service actually was in terms of years.

It was suggested at 3.4.6 that the period covered by VI.1057 and 1058 was about the same as the normal period of service. This relationship was worked out without reference to 'external' historical data, and was valid whatever the period actually was: 1058, it will be remembered, bears the date of A.D. 210, while 1057 does not bear a date. In order to keep the arithmetic logic in one place, the subsequent part of Chapter 3 went further into the analysis of those two inscriptions making use of the conclusion of this section regarding the length of normal service, so it is important to emphasise now the precise point the analysis had reached when it became necessary to use the 'external' historical data.

Up to and including 3.4.6 the actual length of service was irrelevant. It is hoped, therefore, that no confusion will arise, and that circular arguments will be avoided, if we now make use of those two same inscriptions to help us deduce the normal period of service. This may be achieved if we deduce the date of 1057.

Inscriptions of the type to which 1057 and 1058 belong are unusual, and, in the case of the Vigiles, those that carry dates belong to either of only two years: 205 and 210. To 205 belong VI 1055 (coh.IIII) and 1056 (coh.I): and to 210 belong 1058 (cohV) and 1059 (coh.II). The objection that so few inscriptions cannot tell us the date of a fifth because so few dates are indicated may be countered with the fact that 205 and 210 are not the obvious dates for any known celebration or anniversary: thus we are likely to be concerned with dedications particularly associated with those two years. Also, the apparent upward movement of men from 1057 to 1058 has shown that 1057 is the earlier, and there has been general acceptance of the date 205 for 1057. This dating is so reasonable, and any alternative so unreasonable, that it provides an excellent foundation on which to build a further hypothesis. Dating 1057 to 205 means that 1057 and 1058 cover a period of 6 years; hence, from 3.4.6, the normal period of service in the Vigiles should also be about 6 years.

Secondly, we have seen that Latins who served in the Vigiles could acquire full citizenship after 6 years' service (5.2.4). In order to qualify, this period of 6 years was complete, that is, no further service was actually required of the Latin. The other services to the state for which 6 years were required worked on the same principle.

The crucial question is whether the period of service demanded of the Latins differed from the normal period of service demanded of the Vigiles in general. For practical reasons it is unlikely to have been different. Moreover, for the same reasons that applied in the case of the Latins, it is probable that the period of service prescribed for the freedmen in general who served in the Vigiles was also 6 years. The analogy with infantry service in a legion is a strong one. There was, it is true, another qualifying period in use for the Vigiles, one of 3 years which led to admission to the right to frumentum publicum (on this, see 5.2.8), but some of the frumentum inscriptions show men still serving well beyond 3 years, and the required period of service seems never to have been reduced to 3 years.

This conclusion may be strengthened by reference to the grants of citizenship to soldiers upon discharge from the army. Although such grants were not technically contemporaneous with discharge, there is little question that the grant was most commonly made upon completion of the normal period of service (for the precise terms, see Mann 1972). Indeed, the modern misnomer 'discharge certificate' for 'citizenship diploma' does reflect ancient practice. Thus, although the precise period of service in the Vigiles was fixed with reference to the status of the men, analogy with military practice tends to imply that the Latins who received the citizenship would do so at the end of their normal period of service.

Confirmation that 6 years was the normal period of service may be found in the attested lengths of service of men who died apparently still in service. These are as follows (in years, and months and days where given):

Reference	Length of service at time of death
VI.2992	1.(?)6
VI.2986	1.8
VI.2970	1.10
X.5669	3
VI.2964	6
VI.2975	6
VI.32757	6
VI.2983 = VI.7845	6.6
XI.1438	6.7
VI.2990	6.8.11
VI.2967	7
VI.2978 = VI.7007	8
XI.3520	11
VI.2971	13
VI.2987	14
VI.2966	22

The number of these inscriptions is very small, particularly since we may estimate that over a quarter of a million men must have served in the Vigiles. Even so, the lengths of service are totally inappropriate for a period of service similar to those in the other branches of the Roman army: there are too few long periods and too many short ones. On the other hand, although these inscriptions are too few to suggest a normal period, they do suit very well a period less than 10 years and more than 4; 6 fits very neatly.

We may further observe that there is a very wide consistency between the attested stipendia of immunes and principales and the stipendia worked out from VI.1057 and 1058 on the assumption that 6 years was the normal period of service (this anticipates the discussion of the immunes and principales in section 5.3). Turning the argument round, although it is not in doubt that the immunes and principales on 1057 are listed according to length of service, what does need to be emphasised is that the longer the period of normal service which we may assume, the later in their careers do these men attain their various ranks and grades: the consistency with the attested stipendia would be diminished, and the more implausible would become the career structure, with most promotions being made towards the end of the period of service and very few in the first decade or so. Again, the period of 6 years fits very neatly.

To sum up, the special six-year provision of the Latins and the analysis of VI.1057 and 1058 reinforce each other in suggesting that the normal period of service in the Vigiles was 6 years. There is no evidence which supports a different period (the significance of the attested stipendia of immunes and principales is discussed in section 5.3), and acceptance of 6 years brings with it consistency both with attested lengths of service and with the career structure of the immunes and principales.

5.2.6

Very few veterani are attested from the Vigiles, and none of them indicate how many stipendia had accrued to them. M. Iuventius Felix (VI.32754) is described on his tombstone as "vetrano ex coh III vig missus honest missione", and Sextus Modius Salvianus (VI.2989) is described on his

as "veterani ex coh VI vig". The former breaks off after "mil(itavit)", the latter appears complete. Possibly a veteran of the Vigiles is concealed in the poorly-preserved text of XI.2705:

COH V . VIC //
////////
X . VETER . MIL. //
/////////
EC //////D//

The only other veterans of the Vigiles known to me are a group dedicating to L. Tatinius Cnosus, a former centurion of the Fourth Cohort (A.E.1933, 87). These describe themselves as "veterani qui eo in vigilib (us) militaver(unt) et honesta missione missi sunt".

The fewness of attested veterani is, on its own, enough to raise some suspicion that the retirement arrangements of the Vigiles differed in some way from those of other branches of the Roman militia. In general, this would be consistent with their original and official freedman status, and with their normal period of service of only 6 years. But further, we find that Ulpian did not hold that former vigiles could become veterani, despite his assertion that they were properly milites and could use the military form of testament (Dig. 37.13). He sets out his views clearly in his liber de excusationibus (Frag. Vat. 144 and 140):

frag. 144: "Is qui inter vigiles militat, quamvis post emerita stipendia legitima missus sit, non in perpetuum vacat a a tutelis, sed intra annum quam missus est; ultra non vacat."

frag. 140: "Veterani quoque post emerita stipendia missi honesta missione in perpetuum a tutelis vacant."

According to Ulpian, veterans, with the perpetual immunity from tutelae, were different from former vigiles, who enjoyed immunity for only one year after their discharge. Maxfield (1972,II,177) has worked out a chronology for the career of Cnosus, which shows that before he became centurion in the Vigiles he was decorated as evocatus by Domitian. There is thus no doubt that the dedicators' use of the title veterani predates Ulpian's exposition by about a century. Since it is implausible that the status of former vigiles was lowered during that century, so that they lost the privilege of being veterani, we have to reckon with an apparent contradiction in the evidence. How are we to reconcile Ulpian's view with the undoubted appearance of veterani ex vigilibus?

There are probably two elements in the use of the term veteranus by former vigiles. The first is the common use of the word to indicate a discharged soldier (cf.LS.s.v.1), though normally this would be one who had actually served a long time. Since they signed on for a set period of service and underwent honesta missio, former vigiles could easily, despite their shorter service, have assumed or usurped the title veteranus. Secondly, there arises the question how former vigiles were referred to during their first year after discharge, while they enjoyed the immunity from tutelae. For this one year they were unique among freedmen. As freedmen, they enjoyed certain immunities, though with the exception that "a patroni sui liberorum tutela non excusantur" (Ulpian, Frag. Vat.152); but, during this year, they had a special privilege to be excused this one duty which ... normally was obligatory. Thus in relation to their origins they merited some special mark, and the term veteranus is an obvious choice. In some cases, though not all, it is also possible that men used the term after they had served for a long

time in the Vigiles; the 16 years of the Praetorians were sufficient to qualify for the status of veteran, and it is probable that any period approaching this would be held to qualify. But it is most likely that the question of time was only secondary: primarily the term will have indicated an achievement by a freedman which brought with it a rise in status and a unique privilege. Legal niceties were over-ridden by justified pride.

5.2.7

On pay, Watson (1971) is in agreement with BR (68f.) that at first the Vigiles will have been paid less than legionaries. BR also supposes that "there is no reason to suppose that it was brought up to the legionary standard." Watson, however, argues that their pay actually overtook that of legionaries.

At the start, the status of the freedmen would have ensured that the pay was below that of legionaries. It should, however, as Watson points out, have been above that of infantry auxiliaries. As time went on, the Vigiles must have been thought of more in connection with the Urban and Praetorian cohorts than with the legions, and Watson cites in particular the career structure for the centurions and tribunes which was very closely linked with the other Roman units. In support of this, he refers to X.6674 (= D.2020), in which a centurion of the Vigiles is listed after a Praetorian centurion but before a legionary centurion:

> L.Veratio C.f. Qui. Afro, Foro Iuli, veterano, decurioni, quaestori Anti, L. Munatius Sabinus 7 specul., C. Mamillius Naus 7 coh. VII pr., N.Naevius Rufus 7 coh. VI. vig., L. Veratius Certus 7 leg., heredes.

On general grounds of style this inscription may be assigned to the first century A.D., but in addition Dr. Mann suggests that the somewhat unusual occurrence of a veteran (the deceased) holding municipal office and having taken the tribe of the colony in which he held office (Antium, tribe Quirina) tends to suggest that the deceased was one of the original colonists: and the colony was founded by Nero. This closer dating puts the inscription a little into the second part of the first century. Watson comments after citing this inscription (p.414): "It is hard to believe that the pay of the Vigiles still remained below that of the legions".

There is nothing to suggest directly when the change took place. Tacitus sheds a little light (Ann. 1.8) in writing of the legacies of Augustus to the troops:

"... praetoriarum cohortium militibus singula nummum milia, urbanis quingenos, legionariis aut cohortibus civium Romanorum trecenos nummos viritim dedit."

From this, the absence of the Vigiles suggests that in A.D.14 they were still reckoned below the legionaries and the other citizen troops, and this is consistent with their absence from the list of troops referring to A.D.23 (Ann.4.5), where the "proprius miles" of the City is defined as "tres urbanae, novem praetoriae cohortes". (In this interpretation I differ from Breeze 1970,I,91f., who takes the "urbanis" to include the Vigiles.) Thus the change may be placed certainly after A.D.14, and probably also after A.D.23; possibly the development (by the time of Nero) of the career patterns for centurions and tribunes had some effect on the standing of the corps; see Dobson and Breeze (1969) for the centurions, and Dobson (1955, I.44) for the tribunes. It is unlikely that the presence of cives Romani ingenui in the Vigiles had any effect on the standing of the corps, if there were any at such an early date: by the time that they seem to have become more prominent (later second century), the order of precedence had already been established for a long time. So, at some time between the middle of the reign of Tiberius and the reign of Nero, the Vigiles will have advanced in standing, and may have received a corresponding increase in pay (it should be noted, however, that Watson suggests the reign of Trajan for the attainment of parity with the legions: see (2) in the next paragraph; but the early date of X.6674 may imply that the change came earlier and should be ascribed to Nero).

For the actual amount of the pay there is no direct evidence, and Watson puts forward suggestions for which he makes the modest claim that they are not unreasonable but which do possess the merit of consistency. The basis of the arguments are set out by Watson, and need not be repeated here. The historical development outlined above enables him to fit the Vigiles into the patterns which he has deduced for other branches of the Roman army. Briefly, his suggestions are as follows.

1. When the Vigiles were established, pay was above that of infantry auxiliaries (75 denarii a year) and below that of legionaries (225 denarii a year): 150 denarii a year is suggested for the Vigiles.

2. Possibly in the time of Trajan, when the subprefect was added to the establishment, and probably after an increase under Domitian, the Vigiles achieved parity with the legions: at this stage, then, they will have received 300 denarii a year.

3. With the increase of pay by 50% under Severus, it is suggested that the Vigiles will have received 450 denarii a year.

4. Following the further 50% increase under Caracalla, the Vigiles will have received 675 denarii a year.

The whole question of pay is a difficult one, and broadly Watson's suggestions seem acceptable. One qualification which is worth noting is that the date of X. 6674 may, as we have seen, imply that there should have been a pay rise before the earliest which is suggested by Watson (under Domitian). Or possibly the Vigiles had parity with the legions right from the start. For the moment, however, I propose to let the matter rest there.

The Vigiles were paid from the public treasury (Dio 55,26) and when this did not prove adequate from the new 2% tax on the sale of slaves (Dio 55.31). From this latter passage BR (p.65) deduces that the Vigiles were paid from the aerarium militare, but this latter remained restricted to the provision of gratuities for veterans and did not concern the Vigiles.

5.2.8

There is just one piece of evidence which shows explicitly that the Vigiles received frumentum publicum. This is the inscription XIV.4509, which is generally difficult to read but does clearly include the words "frumentum publicum accipit". From this it is possible to interpret the abbreviation "F.P.A." on other inscriptions as "f(rumentum) p(ublicum) a(ccipit)", and so to deduce something of these arrangements.

The most useful piece of evidence concerning practical details of the Vigiles' right to frumentum publicum is the bronze tablet VI.220. This was dedicated to Severus, Geta and Caracalla in A.D. 203 by a group of vigiles who were commemorating their admission to the right of frumentum publicum after three years' service. As well as recording the names of the officers and immunes and principales, it gives details of the men themselves, all in one century, and in particular it gives the following details concerning the frumentum publicum:

1) II QVI FRVMENT PVBL INCISI SVNT KAL MARTIS

This shows that the official year used by the Vigiles ran from 1st March. This is despite the fact that the dates of joining of the individual men run from 31 May in 199 to 13 February in 200; 3 clear years elapsed between this

last date and the year, 203, in which they were admitted to the right of receiving frumentum publicum. A man might thus serve nearly four years before he was reckoned to have served for three.

The First of March was a day of some importance, being the traditional start of the new year, and in particular the date of the festival of Mars Victor, an important military festival (Fink, Hoey and Snyder, 1940, 82-85). There is, further , the inscription VI.31147 (=D.2182) which suggests that 1st March was also the start of the military year. This is an altar to Juppiter Optimus Maximus and the Genius of Hadrian, set up in 139 on the Kalends of March by men discharged from the Equites Singulares "ad diem" (line 4). Fink, Hoey and Snyder (p.85) argue that this altar was set up because that date was a military holiday, but it is difficult to follow them in this. "Ad diem" is crucial, because it does imply that the Kalends of March was the precise day for the men to be discharged, whereas normally men might wait somewhat longer and thus serve more than the legitima stipendia. On this view, it is a coincidence as far as the dedicators were concerned that that date was also a festival; they were celebrating their unusually prompt discharge. Also, it is against the case put forward by Fink, Hoey and Snyder that in fact the altar was dedicated not to Mars Victor but to Juppiter and the Genius of the emperor. If we accept the alternative explanation of VI.31147, VI.220 appears in a different light. Fink, Hoey and Snyder comment thus on VI.220 (p.68,n.200):

> "CIL VI, 220, on the other hand, is an inscription of the vigiles,whose personnel and conditions of service were so different from those of the rest of the army that no general conclusions can be drawn from it."

A deduction which does seem to be justifiable is that VI.220 shows the Vigiles to have been following the rest of the army in organising their year. In other cases, too, where the military analogy was useful and did not conflict with any special arrangements, the Vigiles followed the rest of the army.

2) The typical entry for each of the men runs like this:

Name - origo - date of being miles factus - F P A D (number)T(number) K C

The expansion of these latter abbreviations except for K C is attested on XIV.4509: f(rumentum) p(ublicum) a(ccipit) d(ie) (number) o(stio) (number), where ostio is clearly equivalent to tabula. Mommsen suggested that K C might stand for k(apite) c(entesimo), with uncertain significance (VI.220n.) The numbers are those of the day on which and of the counter over which the frumentum was received. Incidi was the technical word for being placed on the list of those eligible to receive the frumentum (cf.Pliny Pan.28: "et quanto maiorem infantium turbam iterum atque iterum iubebis incidi"), whereas accipere referred to receipt of the actual frumentum.

3) What is most significant about the numbers for the day and for the counter is that they are the same for all the men in the list:

d(ie) X . t(abula) CXLIV

Since these men were all recruited in the same (notional) year, we may conclude that each batch of recruits in a century would receive (accipere) their frumentum at the same time from the same place. This deduction, from the only evidence which indicates with precision part of the procedures for administering the frumentum publicum in the Vigiles, is of vital importance for interpreting the other inscriptions concerning frumentum and the Vigiles, a group from Ostia.

The relevant data on these inscriptions is as follows (they all record receipt of frumentum publicum):

XIV.i,4499 (cohort III, 7 Claudi, at Ostia August to December 166):

D	T	Number of Men
VIIII	XLVIII	1
VII	XLI	1
VII	LVIIII	2
I	LVIIII	1
VII	LXXXII	1
uninscribed		5

4500 (men from 77 Quinti Valeriani coh.VI, Iuli Martialis coh.VII, Rufri Octobris coh.I, Opili Dextri coh.II; at Ostia, 7 Marci, December to April 168):

D	T	Number of Men
IX	LV	1
VII	LXIX	2
XXII	XLIV	1
uninscribed		3

4502 (7 Papiri, at Ostia August to December, year unknown):

D	T	Number of Men
XXII	XXVII	1
IX	LXXII	1
XIII	XLI	1
I	IIII	1
uninscribed		1

4505 (7 Carpiani, coh.III; at Ostia December 181 to April 182):

D	T	Number of Men
	CXXVII	1
VIII		1
IIII		1
IIII	X	1
IIII		1

4506 (7 Valent. coh.VI, at Ostia August to December in 189, 194 or 202, and dedicated in November):

D	T	Number of Men
VIII	XXXXII	1
XXII	XXXX	4

4509 (a muddled inscription, most of the data being unusable):

	D	T
T. Afrius Sarapio	?	?
M. Atteius Primitivus	I	XVI

We may deduce from one bit of light amid the darkness that since Sarapio was made miles on VII Idus Iul and Primitivus was made miles on VII Iulias [... , they in fact joined at the same time.

4511 (no details)

D	T
XXII	M
XII	XXX

Using the conclusion that in each century the recruits of one year would receive their frumentum at the same counter at the same time, we can say that the appearance of different counters and days in these records

indicates either that the men were recruits of different years or that some of them had been transferred from other centuries (something which I do not envisage as having occurred frequently: cf. 3.7.4). On 4499, 4500 and 4502 it is possible that the men at the foot of the lists whose numbers are not inscribed had the same numbers as the men immediately above. It is also possible that on 4500 the four (or possibly three) sets of numbers belong to the four (or three) centuries attested, with the possibility that all the men were in the same year of service. On 4499, then, the intake of 5 different years would appear to be represented, of 1 year, at least, on 4500, of 4 years on 4502, of 2 on 4505 (at least, though it need not be more than 2 if the "D IIII" was accompanied by the same "T" number each time), of 2 years on 4506, of 1 on 4509, and of 2 on 4511.

Since these men in receipt of frumentum publicum must have completed three years' service at least, the following are the minimum years of service which must be represented (though some could be much higher):

4499	8th
4500	4th
4502	7th
4505	5th
4506	5th
4509	4th
4511	5th

Apart from this, these inscriptions give us no information about length of service or rate of recruitment, since we cannot take these as complete lists either of all the recruits per century in any year or of all the recipients of frumentum publicum on any occasion.

The question therefore arises what precisely united the Ostian dedicators. Without the origines we cannot say whether it is pre-existing friendship, nor do we know whether each group was made up of contubernales (though this is the explanation which I would most favour). At most we can be certain that the one thing which they had in common was receipt of their frumentum publicum at Ostia.

The method of providing the vigiles with their frumentum publicum while at Ostia was discussed, inconclusively, by Van Berchem (1939, 42), and in addition he suggested a reason why these inscriptions might have been set up:

> "Les vigiles d'Ostie assurément ne remontaient pàs a Rome pour y recevoir leur ration de blé; pourquoi donc s'en prévalent-ils sur leurs inscriptions?
>
> A notre avis, ils ne franchissaient pas le seuil du portique de Minucius. Mais s'ils réfèrent aux listes qui devaient y être affichées au moment de la distribution, c'est uniquement pour publier leur qualité nouvelle de citoyens."

We have seen that the vigiles were regularly admitted to the right to frumentum publicum on 1 March, and they will have collected the frumentum monthly (Suet. Aug. 40). Only in one case, that of 4505, did the first of March fall within the period of duty at Ostia, so that newly-admitted men could have been receiving their first frumentum; in all the other cases, the men must have waited several months, and for some the delay appears to have been several years. It is therefore justifiable to reject Van Berchem's suggestion, while admitting that we do not have sufficient data to form an alternative. Possibly, the mere fact of being in receipt of frumentum publicum would have been worth advertising.

It is unlikely that the vigiles would have had to return to Rome monthly to collect their corn. Since about half the vigiles would have been in receipt of frumentum, some procedure must have been worked out and used regularly. Probably the names of those about to leave for duty at Ostia were submitted to the staff of the praefectus annonae, who could then issue tesserae for the next four months for these men and advise the staff of one of the granaries at Ostia that these men would be coming to collect their frumentum. There must have been some special arrangements for admitting men to the right when they happened to be at Ostia: though again it is unlikely that they would have had to travel to Rome specially. It would be fascinating to know more about these arrangements.

The direct evidence for the Vigiles' right to frumentum publicum is thus epigraphic, though there is, of course, literary evidence for frumentum publicum in general (on this, see Van Berchem 1939). The two pieces of literary evidence (both legal sources) which help to supplement our picture of the Vigiles' right to frumentum are fairly complicated, and before we consider them in detail it is necessary to establish who was eligible to receive frumentum publicum.

Van Berchem observes (p.43) that frumentum publicum was restricted to Roman citizens living at Rome ("civis Romanus domo Roma"). These included both citizens by birth and also freedmen (pp.46-49), but not Junian Latins (p.48). He follows Mommsen in assuming that all the Vigiles were Junian Latins (p.41), with the result that the reward after three years' service is taken to be not merely admission to the right to frumentum publicum but also citizenship itself. But as we have seen (5.2.4)

we must distinguish carefully between freedmen and Junian Latins. In the discussion which follows, Van Berchem's definition of eligibility is accepted, but the two classes of freedmen in the Vigiles are carefully distinguished. The ten inscriptions referred to in the table at 5.2.2 are all frumentum inscriptions, and show that both liberti and ingenui received frumentum. Soldiers could count as their domus the place where they were serving if they had no property in their place of origin (Dig. 50.1.23), and we might therefore wonder whether some of the Vigiles were not eligible in their own right. The complication is caused by the presence of Junian Latins.

In setting out the position regarding the rights of Junian Latins, Gaius and Ulpian write as follows:

> ". . id est fiunt cives Romani si Romae inter vigiles sex annis militaverunt. Postea dicitur factum esse senatusconsultum, quo data est illis civitas Romana, si triennium militiae expleverint."
>
> (Gaius, Inst. 1.32b)

> "Militia ius Quiritium accipit Latinus (si) inter Vigiles Romae sex annos militaverit, ex lege Visellia, praeterea ex senatus consulto concessum est ei ut si triennium inter Vigiles militaverit ius Quiritium consequatur."
>
> (Ulpian, fr.3.5)

These passages refer just to Latins (cf.5.2.4), and there appears to be some indication that the six-year provision had been altered. BR implies that the use of the present tense in describing the six-year provision indicates that it remained in force (p.67), and he also takes Gaius' "dicitur" to indicate that "he was not very certain about it" (p.67).

We should, however, be careful to distinguish between the men of different status who served in the Vigiles. No special dispensations were needed to enable the citizens by birth and the freedmen proper to receive the frumentum, while from A.D.24 (under the Lex Visellia) Junian Latins acquired Roman citizenship after six years' service. Probably the specific issue of frumentum to the Vigiles en bloc was introduced with the freedmen in mind, and the cives ingenui were absorbed into the system. The Junian Latins, though, were technically still slaves. The simplest solution, then, would have been to give them their citizenship after three years instead of six. Was this the purpose of the senatus consultum? Did it supersede the clause in the Lex Visellia? Evidently the latter remained in the record, though the use of the present is less decisive than BR supposed, since it would be perfectly natural and normal to cite a law in this way. It would have become redundant, however. It is odd that it is Gaius, the earlier of the two writers, who uses the word "dicitur" in referring to the senatus consultum. If there was any doubt, it seems to have disappeared by the time of Ulpian. Possibly, however, Gaius was accurately recording what was the common impression, in the knowledge that there was a slight technical inaccuracy. It is not out of the question that what the senatus consultum actually granted was not the right to citizenship but the right to frumentum publicum. In this case, if the Vigiles en bloc were awarded the right, the Junian Latins would thereby seem to have won an additional path to the citizenship. This would be sufficient to explain Gaius' "dicitur", and also to explain why the Lex Visellia continued to be cited. Indeed, some link such as "dicitur" would now be needed in order to demonstrate the

relevance of the senatus consultum to the provision of the Lex Visellia. This explanation of the apparent confusion enables the sources to be taken at face value, and is also consistent with what is known generally of the legal untidiness of many Roman arrangements.

To sum up, then, it is suggested that the senatus consultum awarded to the Vigiles the right to frumentum publicum and that the Latins who served anomalously in the Vigiles exercised this right as if they were fully entitled to it. When the legal position was first set out, by Gaius, he recorded both the original law concerning the Latins' right to citizenship through service in the Vigiles and also the current impression of the Latins' position in relation to the frumentum publicum. Ulpian, about half a century later, simply set down the lex and senatus consultum as being a complete statement of the position, custom having by this time given legal validity to the earlier impression.

It remains simply to note that, like the six-year period of service (5.2.4), the three-year period was considered suitable for meriting a reward for service to the state. In the passage from the Lex Iulia municipalis (quoted above, 5.2.4), three years of cavalry service in a legion made a Roman citizen aged less than 30 years eligible to stand for municipal office, while Trajan provided that a Latin who provided a mill and ground 100 modii of corn a day for three years at Rome was granted Roman citizenship (Gaius Inst. 1.34). It appears from the dates of the known provisions of this sort that although both the three and six year periods were used in the Republic, the last use of the six-year period was instituted by Claudius whereas the three-year period continued to be instituted after that (i.e. in effect the longer period gave way to the shorter). There is no way of dating the change in the arrangements of the Vigiles: the senatus consultum must belong within the period from A.D.24 to the time when Gaius was writing

(middle of the second century), and it is tempting to assign it to Trajan, to whom may also be ascribed the introduction of castra vigilum (6.5.1) and the institution of the subpraefectus vigilum (5.6.6).

5.2.9

Although this thesis is primarily a study of firemen and firefighting, it may be convenient to note briefly the evidence for the ages of joining the Vigiles and for the origines of the men.

There are fifteen inscriptions which record both the age at death and the length of service and so indicate the ages of joining; five more show just the ages at death; and three show just the length of service (VI.2967, 2978, 2990; a complete list of attested lengths of service is given in section 5.2.5). The two lists below show the attested ages at joining, and the attested ages at death when no length of service is indicated.

Reference	Age at death	Length of service	Age at joining
VI.2983 = 7845	20	6.6	13
X.5669	20	3	17
VI.2970	20.4.17	1.10	18
VI.32757	25	6	19
VI.2971	32	13	19
VI.2964	26	6	20
XI.3520	31	11	20
XI.1438	27	6.7.19	20
VI.2988	30	9	21
VI.2986	23	1.8	21
VI.2966	44.0	22	22
VI.2987	37	14	23
VI.2992	30	1.( )6	28
VI.2975	35	6	29
VI.2780	55	7 (+ 13 elsewhere)	35

Reference	Age at death
X.4834	22.6
VI.3610	22.0.6.2
VI.34408	25
X.5187	25.(?)
X.1767	28.0.29

Two points stand out concerning these ages: the fact that they are typical of the ages at which men joined the other branches of the army; and the comparative youth of the firemen. Given that the majority served for only about six years (above, 5.2.5), the majority of the firemen must have been less than thirty years old when they completed their service. Even the men who stayed on as principales and immunes need not have been old, and many will not have been anywhere near past their prime. This conclusion reminds us of the typical modern advertisement for firemen: "Fit, active young men required . . ."

Origines are given explicitly on some of the frumentum inscriptions and on some tombstones, and in addition we may use the findspot of a tombstone as evidence for origo if it records (whether as deceased or commemorating) an obvious member of the immediate family of the deceased (particularly the mother or the father). Of indeterminate value are records of a frater (who might equally have been a fellow-soldier as a brother if the name is absent), wife freedman or freedwoman, heir, collegium, as is mere knowledge of the findspot. In cases where the findspot does have evidential value,

vigiles may be found among the commemorators as well as the commemorated.

In the list below, 'S' means that the origo is actually stated (usually in abbreviated form), 'R' means that the mention of a particular relative suggests that the findspot was also the origo.

Origo	Reference	
Rome	VI.220 (six men)	S
	VI.221 (one man)	S
	VI.2962a=6151	R
	VI.2969	R (doubtful)
	VI.2973	R
	VI.2976	R
	VI.2983=7845	R
	VI.2984	R (a cognatus)
	VI.2988	S + R (patroness)
	VI.2994	R
	VI.2994	R
	VI.32756	R
Italy Reg.I, Campania		
Neapolis	VI.220	S
	VI.221	S
Surrentum	VI.221	S
Puteoli	X.1767	R
Capua	XIV.4500	S
Italy Reg.IV, Samnium		
Rufrae	X.4834	R
Histonium	VI.221 (two)	S
Italy Reg.VI, Umbria		
Interamna Nahartium	VI.221	
Tuder	XIV.4500	S
Italy Reg. VII, Etruria		
Blera	VI.221	S
Vetulonia	VI.221	S

Italy Reg. VII. Etruria		
Florentiae	VI.32753	S
	XIV.4500	S
Pisa	XI.1438	R (probably)
Centumcellae	XI.3521	R
Feronia	XIV.4500 (two)	S
Italy Reg. VIII, Aemilia		
Regium	VI.220 (two)	S
Forum Cornelii	VI.2990	S
Ravenna	XIV.4500	S
Italy Reg. IX. Liguria		
Dertona	VI.221	S
	VI.2970	S
Italy Reg. X, Venetiae		
Verono	VI.32754	S
Italy, Reg. XI, Gallia Transpadana		
Ticinum	VI.221	S
Gallia Narbonensis		
Forum Iulii	VI.221 (two)	S
Pannonia Superior		
Emona	VI.34408	S (probably a <u>vigil</u>)
	XIV.4500	S (for the form Aem(ona) of. III.3569 Aem(o)n(a), and III.P.489)
Macedonia		
-	VI.220	S
Lycaonia		
Iconium	VI.2964	S
Cilicia		
Tharsus	VI.220	S
Africa		
Karthage	VI.220 (three)	S
Utica	VI.220	S

Byzacena		
Hadrumetum	VI.220	S
Thysdrus	VI.2987	S
Numidia		
Cirta	VI.32757	S

This evidence should be supplemented by the study of names, notably the lists of the First and Fifth Cohorts (VI.1056, 1057 and 1058). Such a study is beyond the scope of this thesis, particularly since there is the special difficulty with the Vigiles that the City of Rome produced its own unique patterns of nomenclature. However, the evidence from explicit statements and inferred from tombstones, as listed above, shows, first, the predominance of men from Italy and from Rome itself, and, secondly, an apparent lack of men from Gaul and Spain. The totals are as follows:

origo	Number of men
Rome	15-16
Italy excluding Rome	26
other provinces north of the Mediterranean	6-7
provinces south of the Mediterranean	7
	54-56

One important point which has been put to me in discussion has been the apparently large number of Africans on the lists of the First and Fifth Cohorts (notably those named 'Saturninus' or with names ending

in '-atus'), and the possibility was raised whether Africans were brought in to fill out the ranks when the corps was doubled in size in 205. The simple answer, based on initial inspection of those lists and also the analysis given above, is that this was not the case, and that Africans served in the Vigiles before 205 in noticeable numbers. Further work will be needed to establish whether or how the proportion of Africans changed over the years. Otherwise, it seems to be established that recruitment to the Vigiles was based locally, as happened with the rest of the army, and that no more than a quarter of the men need have come from outside Italy.

5.2.10

The annual survival rate in the Vigiles was found to be 89.7% around the start of the third century A.D. (3.112). This rate seems, on first inspection, to be rather high, and one wonders whether men were really attracted to a service in which over 10% of the men disappeared from the lists each year. It is implausible that over 10% died each year, but before we consider factors other than mortality it is necessary to establish what percentage are likely to have succumbed to mortality.

This is a topic for which the evidence is far less good than used to be supposed, and for the general considerations it is best to refer to Hopkins (1966) and Brunt (1971, particularly Chapters X1 and XX1, and Appendix 27). These scholars are in agreement that life expectation at birth is unlikely to have exceeded 30 years, though Brunt suggests a much lower figure. In dealing with the Vigiles we have to beware of assuming that they were typical of a civilian population, and on general grounds it is more likely that their conditions of service affected their mortality in the same sort of way as military service. It is therefore the more valuable that there does exist a certain amount of evidence for military mortality although, as with the Vigiles, the direct evidence is for disappearance from the army lists. The earlier evidence, for legionaries in the second half of the first century B.C., has been analysed by Brunt (1971, 339ff.). The later evidence, for legionary veterans in the second century A.D., has been analysed by Mann (1956,336ff.).

Brunt starts with the statement in the Res Gestae (3.3) that of 500,000 soldiers "sub sacramento meo" 300,000 received land or money on discharge. Then, since at the end of his reign Augustus had 25 legions in service (making up nominally 167,000 men and actually perhaps 140,000),

Brunt argues that Augustus cannot have included in the 500,000 the men still serving (otherwise only 50-60,000 men would have failed to survive, an impossibly low proportion). He then offers reasonable estimates of the numbers of men discharged from before 30B.C. to 28.C. The conclusion which he offers as being the most plausible, despite the need to use a certain amount of guesswork, is that about two fifths of all the soldiers failed to survive and be discharged. This represents an average wastage of about 2% per annum, including perhaps a certain number of deserters. Many of the men will have served 20 years or more, though some of the recruits of 36 may have served for a shorter period. For this period in general an average length of service of about 20 years may be assumed, though it was progressively being lengthened. In the discussion below, the figure which is used is the loss of two fifths over 20 years, or survival of 60%.

For the second century A.D., the only period for which this type of evidence exists, Mann examines the numbers of veterans listed as discharged in certain years after 25 or 26 years' service (discharges being carried out normally every two years). He first calculates how many men could have been discharged biennially per legion, on the assumptions that each legion actually contained 6,000 men, and that normal service was for 25 years. If no men were lost, each legion would have released 240 men each year, giving a biennial total of 480. In fact, these lists suggest that under half this number actually survived to be discharged. The data is as follows (an asterisk indicates that a number has been estimated):

Reference	Legion	Date of recruitment	Date of Discharge	Number Discharged
III.8110=ILS 2303	VII Claudia	A.D.135,136	A.D.160 (probably)	239
III 6189	V Macedonica	A.D.108,109	A.D.134 (probably)	200*
III 6580 & JRS 1942 pp.33ff.	II Traiana	A.D.168	A.D.194	120* (intake of 1 year)
III 14507	VII Claudia	A.D.169	A.D.195	230*
VIII 18068	III Augusta	A.D.173	A.D.198	300*

The numbers of men discharged in the last two cases are unusually large, explicable by the special recruiting needs of particular earlier years. Mann concludes (p.338):

"All told, it is unlikely that the number of veterans discharged from a single legion in any one year will have much exceeded 100, on the average."

The survival of 100 instead of the predicted 240 is taken to show that under half survived (about 42%), a loss of about 58%.

These two estimates of the losses (40% and 58%) can be reconciled when we convert one of them so that we are comparing like with like. The period of service for Brunt's legionaries is 20 years, for Mann's legionaries 25 years. Moreover, I feel that the estimate for the actual size of the legion of 6000 is too large, and that we ought to assume that in general legions were below their paper strength, say about 5,000. Thus over 25 years, the rate of loss for the second century evidence becomes 50%. In order to reconcile the two periods over which the men survive we have to take account

of the increase in mortality as men get older, and in addition we have to formulate our data so that we can bring into the comparison the period of service of the Vigiles, six years.

The United Nations Model Life Tables (U.N.1955) are designed for application to this sort of problem. The nature of these tables is explained in Appendix III, as is the method which has been used to convert portions of them to show survival rates over certain periods starting from certain ages. In our particular case, we are interested in survival over periods of 6, 20 and 25 years. The majority of legionaries and vigiles will have been recruited around the age of 20, so that this is the starting age of chief interest, though the survival rates starting at 15, 25 and 30 years of age are also shown for comparison in the Appendix. These survival rates are applicable to any populations with the levels of mortality shown in the second column in the table below, and for present purposes there will not be much distortion if the actual ancient data includes slight variations from the norm in the proportions of the men within each age group. (A similar use of these Model Life Tables has been made by Hopkins, e.g. in column (e) in his Table 5.)

Model No.	Life Expectation at Birth (Male) in Years	Percentage survival over 20 years starting from age 20	Percentage survival over 25 years starting from age 20
29	33.50	76.052	68.751
30	31.90	74.534	66.798
31	30.35	73.111	64.947
32	28.86	71.702	63.121
33	27.40	70.308	61.317
34	26.02	68.819	59.405
35	24.68	67.319	57.474
36	23.39	65.860	55.606
37	22.15	64.437	53.785
38	20.95	63.028	51.982
39	19.82	61.697	50.285
40	18.74	60.412	48.653

If our two legionary survival rates were controlled entirely by normal mortality, Brunt's calculated rate of 60% would correspond fairly closely to Model 40, which gives a rate of 60.412% survival over 20 years starting from age 20, and Mann's rate (modified to 50% to allow for an actual strength of a legion of 5,000) would correspond to Model 39, that is, survival of 50.285% over 25 years starting from age 20. Since it is probable that the distribution of battle casualties was spread fairly evenly throughout the age groups in the legions, we may take it that the difference in the two survival rates of 10% is explicable mainly by the operation of normal mortality in two differing periods of service. What is important is the closeness of the two levels of mortality which correspond to the survival rates: the slight difference, indicated by the selection of two consecutive Models, may well be explicable by the greater amount of fighting which took place in the last half of the first century B.C. If, as seems most probable, this is in fact the case, then the difference of 1-2% in the survival rates in the two Models is a fairly precise indication of the rate of battle casualties, and this confirms Brunt's suspicion (p.134) that battle casualties would not normally add greatly to the mortality losses in an army. It should be noticed, however, that the conditions of military service may have caused a higher mortality among soldiers than obtained among civilians, particularly from susceptibility to epidemics, and that most of the losses from the army lists may have been due to mortalities (Brunt pp.134f). In respect of their living conditions, the Vigiles probably resembled the other troops, being crowded in their castra and not helped by living in Rome, so that the rates for the legionaries are directly comparable.

In selecting Models 39 and 40 as approximating most closely to the survival rates for the legionaries what we have actually established is a lower limit for military mortality. Not only will these rates include (though perhaps to an imperceptible extent) sundry losses from the army other than those due to mortality, but there is in addition the ample evidence from inscriptions and from citizenship (discharge) diplomas that legionaries did in fact manage to produce offspring and so need not necessarily represent a declining population (i.e. with a hypothetical life expectation at birth below that of Model 40). It is more difficult to establish an upper limit, though for the reasons indicated in the preceding paragraph it is unlikely to have been more than one or two Models higher than 39 or 40.

We are now in a position to estimate the sort of figure which described normal (i.e. non-firefighting) mortality among the Vigiles. The lack of precision which will be forced on us by the nature of the evidence does not crucially matter. This is because the Vigiles served for a shorter period than the legionaries, and were generally a much younger age group. As explained in Appendix III the portions of the age scales which refer to the Vigiles are subject to the least variation between the levels of general mortality.

To illustrate this point, the table below which shows survival rates over 5 years starting from age 20 includes data from Model 29 right through to Model 40; though it is the bottom three or four Models which are most relevant to the Vigiles. In the third column the survival rate over 6 years is shown; this has been established by decreasing the survival

rate over 5 years by one fifth of the survival rate for the next age group (25-29). The fourth column expresses this as the average annual percentage mortality over the six years of column 3.

Model No.	Percentage survival over 5 years starting from age 20	Percentage survival over 6 years starting from age 20	Average annual percentage mortality for column 3
29	94.363	93.206	1.133
30	94.029	92.799	1.217
31	93.742	92.444	1.259
32	93.461	92.095	1.317
33	93.185	91.752	1.375
34	92.870	91.366	1.439
35	92.559	90.985	1.502
36	92.257	90.614	1.564
37	91.920	90.211	1.631
38	91.677	89.902	1.683
39	91.406	89.569	1.739
40	91.146	89.249	1.792

It will be seen that the survival over 6 years ranges from 93.206% in Model 29 to 89.249% in Model 40. Per annum the corresponding mortality rates average out from 1.133% to 1.792%. The annual percentages in the bottom Models are very close to each other: the choice of Model is not crucial. The annual normal mortality is always less than 2%. It would only become greater than 2% if most of the men were recruited over the age of 25 (Model 40) increasing to age 40 (Model 29); but even the exclusive recruitment of men over 50 in Model 40 would produce a rate of only 5.54%.

It will now be clear why the imprecisions in these calculations do not matter: the annual wastage worked out from VI.1057 and 1058 is about 10%, always over 5 times the possible mortality rates which have been worked out. No amount of refinement, nor the addition of error to error, will make these different rates the same. It might be argued that the difference would disappear if we assumed that the Vigiles served for periods comparable to those of legionaries. But this would go against the trend of the evidence, and would also ignore the special conditions which can exist in a fire brigade. In fact, the apparent discrepancy is very important for our understanding of the Vigiles.

We should exclude the possibility that the high wastage was due to fatal accidents in the course of firefighting. Apart from the improbability of men joining a service in which one in ten of the men were killed in a year, there is no reason to suppose that any large proportion of the men would actually have been engaged at the scene of a fire. The majority would have been in bucket chains or controlling crowds, with only a small proportion actually throwing water onto the fire and engaged in such other risky tasks as carrying out rescues (4.27). Moreover, without breathing apparatus, at some fires a smaller proportion of the men actually needed inside a burning building could have got in compared with modern standards. The activities of firefighting then, are unlikely to have increased mortality beyond 2% per annum; this leaves 8% to account for.

There is a much simpler explanation for the high wastage, and one which finds parallels from more recent times, and this is that the men resigned in large numbers. To take one striking instance, Blackstone

(1957, 198 & 302) gives figures for the London brigade in 1872 and 1876, and these show that in a brigade with about 398 men, and with 640 resignations in 10 years, the average annual loss due to resignations was about 16%. There were two main reasons for these resignations: the occupational diseases of consumption, "lung disease", bronchitis and rheumatism (Blackstone p.196), and secondly the nature of the duties. On these latter, there is ample evidence that the more efficient the brigade was the more arduous the duties were, and, in particular, the more the men were tied to the fire station. If they were lucky, a room might be set aside for courting while they were on call, and if a church was near (it rarely was) they might be allowed to attend, but normally all the men - married as well as single - had to remain within the confines of the fire station. This, indeed, is the reason why some brigades recruited only from ex-sailors. As Blackstone explains (p.118):

> "Though it was always publicly averred that sailors were selected for the reasons given by Braidwood [obedience, familiarity with night and day watches, and being accustomed to uncertainty], and for their general handiness and agility, in the comparitive privacy of Royal Commissions and Select Committees over the next hundred years municipal representatives often admitted that they were selected because, being used to confinement aboard ship for long periods, they were less averse than others to confinement in a fire station for even longer."

It may be suspected that some significance is thus to be attached to the fact that it was only seven years after London removed the restriction on recruiting from ex-sailors, in 1899, that the first firemen joined a trade union, in 1906 (Blackstone, pp.269 and 310).

In other words, it may be an indication of efficiency and discipline if we find many men leaving regularly, and in this respect there is, broadly speaking, a difference from discontented men in an army: they can be made to stay and do something considered useful, whereas a discontented or invalid fireman is a risk and a handicap (though in modern conditions in Britain and some other countries there is some scope for the continued employment of casualties). Clearly, because of the centurions, the Vigiles were under military discipline and a potential recruit would know this. Probably men were taken on in full knowledge of the conditions and were allowed to resign if the duties rendered them unsuitable. Evidently there was no lack of volunteers. In these circumstances, there would not have been any special reason to recruit from ex-sailors (and it must be suggested that the joint celebrations of vigiles and sailors arose from some other grouping: VI.1063,1064). It is interesting that the wastage rate in the Vigiles due to resignation, estimated to be 8%, is about half the rate of resignations calculated for the London brigade in the 1870's (16%), and this difference could well be explicable solely by the shorter period of service demanded of the Vigiles. A man might tolerate the conditions for a short and known period, whereas he might be less willing if the period were longer and possibly unknown. Thus, whatever we might make of the moral aspects of the high wastage rate of the Vigiles, there is no doubt that this testifies amply to the demands and to the quality of the service. Not the least of the arduous duties were the continuous night patrols.

We are now in a position to estimate for which period this survival rate is valid. If it was the nature of the duties which chiefly

governed the rate, then we should not expect it to have varied much at all throughout the history of the Vigiles. Night patrols were demanded at the outset (Suet. Aug. 30), and even after the corps was doubled in size in 205 it seems not to have been large enough for all contingencies (see 7.3.12 for the provision for reinforcements at the Secular Games in 214). It is possible that the increases in pay had some effect on resignations, and also the provision of castra in Rome (attributable to Trajan: see 6.5.1) may have eased the living conditions and improved morale. The greatest influence on morale must have been the qualities of the individual officers. But none of these can have had much effect on the wear and tear of regular night duty. Resignations are always likely to have been in the region of 8% per annum, from the time of Augustus until the abolition of the corps in the fourth century.

5.3.1

We now examine the immunes and principales. These were "soldiers below the rank of ... centurion who held a permanent post" (Breeze 1970,I,1), comprising the nco's, specialists and technicians. Immunes were excused fatigues in return for carrying out their special duties (Dig.50.6.7.6), while principales received "privileges" for carrying out theirs (Veg. de re mil.2.7). In practice, the distinction was blurred, with some posts being variously ascribed to one category or the other (and this depended partly on the period in question). In principle it seems that the main privilege of the principales was extra pay. Those who received one and a half times the pay of the rankers were known as sesquiplicarii, those who received double pay duplicarii. (The evidence is set out and discussed by Breeze 1970, App.I.)

Breeze (1970) provides the best full-length study of immunes and principales, and I am pleased to acknowledge that this section has benefited from discussion with Dr. Breeze. The scope of this section is to establish the system within the Vigiles, suggesting modifications to Dr. Breeze's scheme, and to explore the implications of the system for the functioning of the Vigiles as a fire brigade. Dr. Breeze and I are broadly in agreement over conclusions which are based on career inscriptions. The chief differences arise from the analysis of VI.1056, 1057 and 1058 in Chapter 3. This analysis enables us to supplement the career inscriptions by adding conclusions as to the years of service in which most of the immunis and principalis posts were held, and these may in turn be related to the hierarchical order of the posts to provide us with a clear picture of the workings of the system. The analysis in Chapter 3 is based, in its details, on the conclusion (argued at 5.2.5) that the normal period of service in the

Vigiles was 6 years, with the possibility of some of the men staying on beyond this term (3.4.6 onward). The tables at the end of Chapter 3 (3.12.1,2,3) show that the majority of the men who stayed on beyond 6 years were in fact immunes and principales, and the more senior ones at that. This distinction between the normal, six-year, term and the longer career followed by some of the immunes and principales provides the major difference between Dr. Breeze and myself. In addition, the period of 6 years for the normal term of service departs from the received opinions (e.g. 25 years: Breeze 1970, esp.I.92f).

5.3.2

We start with VI.1056, 1057 and 1058. The titles of the posts in these lists are usually abbreviated and in the summaries below there is little difficulty over the expansion of most of them; the doubtful and ambiguous ones are indicated. The tendency of the expansions is to be cautious (for detailed discussion reference may be made to Breeze 1970, II, 60ff).

? a ballistis	AB, ABAL	1057.1.[11],5[15],6[11] 1058.1.[14],3[13]
actarius praefecti	AC PR	1057.2.[62] 1058.3.[3]
?	AQ, AQV	1056.1.[2],4.[6] 1057.6.[12]
? aquarius	AQA	1058.5.[13]
?	AQCO	1057.2.[8]
a quaestionibus praefecti	AQP, AQ PR	1057.3.[1],3.[70] 1058.4.[3],5.[2]
beneficiarius	B	1057.5.[81]
?	BAR	1058.4.[15]

?	BF	1057.5.[2]
beneficiarius praefecti	BP, BPR, B PR	1056.2.[14]
		1057.1.[1],1.[17],2.[4], 3.[24],6.[1]
		1058.1.[1],3.[2],4.[4], 5.[1],5.[8]
? beneficiarius subpraefecti	~~BS~~, ~~BS~~	1056.2.[1],4.[8]
? beneficiarius subpraefecti	BS PR	1057.2.[1]
beneficiarius subpraefecti	~~B S~~ PR	1058.7.[2]
beneficiarius tribuni	BT, B T, BTR, B TR, BETR	1056.1.[5],2.[5],2.[9],3.[9]
		1057.1.[3],2.[7],2.[13], 3.[13],4.[18],4.[19], 6.[9],6.[18]
		1058.1.[11],3.[7],7.[6], 7.[7],7.[8]
bucinator	BV, BVC, BVCC	1057.1.[56],1.[94],4.[51], 6.[24],7.[8]
		1058.4.[10],5.[9],7.[14]
cacus	CACVS	1058.7.[15]
? carcerarius	CAR	1058.2.[7]
?	C O	1056.4.[2]
cornicularius praefecti	CORPR, COR PR	1057.4.[2]
		1058.3.[1],4.[1]
cornicularius subpraefecti	COR S PR	1058.7.[1]
cornicularius tribuni	CoRT	1057.5.[1]
?	CPC	1057.4.[11]
codicillarius tribuni	CT, C T, CTR, C TR, CO TR, COD, CODTR, COD TR	1056.2.[78],2.[86],4.[93]
		1057.1.[42],1.[65],1.[108], 3.[62],3.[69],5.[27], 5.[60],5.[86],6.[39], 6.[48],7.[21]
		1058.1.[54],2.[2],2.[5],2.[6], 3.[10],3.[11],4.[13], 4.[14],5.[14],6.[4], 7.[19]
?	..]C	1057.7.[12]
?	EM	1056.3.[12],4.[7],4.[47]
?	EMB	1058.5.[6]

?	EM C	1058.7.[18]
?	EMER	1056.3.[7],3.[8]
?	EMR	1057.2.[6]
exceptor	EXC	1058.6.[3]
? exactus praefecti	EX PR	1056.2.[69]
		1058.7.[9]
exceptor tribuni	EXCT, EXCTR	1057.7.[34]
		1058.3.[12]
?	HC	1058.2.[4]
? = EMB	HEMB	1057.7.[5]
? horrearius	HO	1057.2.[87]
imaginifer	IM, IMA	1056.3.[3],4.[5]
		1057.6.[5]
? imaginifer	IMC	1057.1.[2],6.[2]
		1058.1.[3]
carcerarius	KARC	1057.7.[4]
librarius	LIB	1058.3.[9]
librarius subpraefecti	L S PR	1058.5.[7]
librarius tribuni	L TR	1057.1.[10]
?	.]MI	1057.4.[3]
?	O	1057.5.[131]
?	OC	1056.1.[7],3.[2],4.[18]
optio centuriae	OP, OPT, OP7,	1056.1.[3],2.[2],3.[5],4.[4]
	OP 7, OPT 7	1057.1.[6],2.[2],3.[3],4.[5]
		5.[4],6.[3],7.[15]
		1058.1.[5],3.[5],4.[6],5.[4]
		7.[4]
? optio armamentarii	OPA	1057.1.[21]
optio (?)	OPC, OPTC, OPT C	1057.3.[18]
		1058.1.[12],4.[8],4.[9]
optio carceris	OPCA	1057.2.[10]
optio ballistae (-arum)	OPB,OPTB,OP BA	1057.4.[6],7.[1]
		1058.4.[4]
optio convalescentium	OPCO, OPT CONV	1057.6.[13]
		1058.7.[10]
?	ORPR	1057.2.[9]
?	P B R	1056.4.[1]
praeco	PRE C	1058.1.[2]

?	PR PR	1057.4.[1]
?	Q	1056.1.[1]
?	S	1056.1.[28],3.[38],4.[16]
?	S[	1057.7.[11]
secutor tribuni	ST, S T, STR, S TR, SETR, SEC TR	1056.1.[6],1.[56],2.[7], 2.[52],3.[31],4.[26], 4.[46] 1057.1.[5],1.[50],1.[73], 2.[36],2.[72],2.[107], 3.[11],3.[35],4.[44], 5.[44],6.[19],7.[13] 1058.1.[13],2.[1],2.[3], 3.[8],4.[11],4.[12], 5.[10],5.[11],5.[12], 6.[1],6.[2],7.[11], 7.[12],7.[13]
sifonarius	SIF	1057.5.[8],5.[24] 1058.6.[5],6.[6]
?	SN	1056.4.[98]
?	S PR	1056.3.[1]
?	SV	1057.5.[12]
tabularius	TAB	1057.3.[5]
tesserarius	T 7, TES, TESS, TES 7, TESS 7	1056.1.[4],2.[4],3.[4],4.[9] 1057.1.[4],2.[5],3.[8],4.[4], 5.[3],6.[6],7.[9] 1058.3.[6],4.[7],5.[5],7.[5]
?	?] T	1056.3.[41]
?	?] TR	1056.1.[10]
vexillarius	VEX, VEX7, VEX 7	1056.1.[53],2.[3],3.[6], 4.[3] 1057.1.[7],2.[3],3.[2],4.[7], 5.[7],6.[4],7.[3] 1058.1.[4],3.[4],4.[5],5.[3], 7.[3]
? unc(in)arius	V	1056.3.[14]
? unc(in)arius cohortis	VC	1056.2.[6]
unc(in)arius	VNC	1057.7.[2]
unc(in)arius cohortis	VNC COH	1058.7.[16],7,[17]
victimarius	VIC, VICT	1056.3.[11]; 1057.3.[4]; 1058.3.[14]

5.3.3

Next we must establish the order in which the posts were ranked. Three pieces of evidence are (1) the order of the posts on VI.1058, (2) the changes in posts held by some of the men who appear on both VI.1057 and 1058 (of A.D.205 and 210 respectively), and (3) the four inscriptions which record careers or parts of careers. All these types of evidence were used by Kellermann (1835), Domaszewski (1908) and Breeze (1970), but the lack of an explanation of the pattern within 1057 and 1058 left too many ambiguities and unknowns. Domascewski observed (p.7) that on 1058 the order (i.e. of *immunes* and *principales*) was by rank whereas on 1057 it was by length of service, and to the extent that he did not try to tie it down to *stipendia* he produced valid, though limited, conclusions.

The table below sets out the order of the posts on 1058. (For their precise position in the lists see 3.12.2.) In general the posts of *codicillarius tribuni*, *secutor tribuni*, *beneficiarius tribuni*, *tesserarius*, *optio* and *vexillarius* provide fixed points above and below which the other posts are arranged consistently. The occurrence of a few of the posts out of the normal order is shown by indentation; a post off totally ambiguous position is indented for each occurrence. 'o' indicates that owing to damage on the stone there is a gap in the evidence, but it may, none the less, be restored with confidence.

In some cases only a general relationship between particular posts is established: e.g. this table does not show whether LIB should be above or below AQA, though both are placed between C T and S T; on the other hand, VNC COH comes below CACVS.

POST	CENTURY 1	2	3	4	5	6	7
COR PR			x	x			
COR 3 PR							x
B PR	x		x	x	x		
B S PR							x
PRE C	x						
AQ PR				x	x		
IMC	x						
OP BA				x			
AC PR			x				
VEX.	x	o	x	x	x	o	x
OPT 7	x	o	x	x	x	o	x
TESS	o	o	x	x	x	o	x
EMB					x		
L S PR					x		
B PR					x		
B T	x		x				x
EX PR							x
OPT CONV							x
OPT C	x			x			
BVC				x	x		
S T	x	x	x	x	x	x	x
BVC							x
CACVS							x
VNC COH							x
COD		x					
S T		x					
HC		x					
LIB			x				
AQA					x		
ABAL	x						
EXC						x	
EM C							x
C T	x	x	x	x	x	x	x
EXC TR			x				
ABAL			x				
BAR				x			
SIF						x	
VICT			x				
CAR		x					

The table below lists the posts of the men who held a post in 205 and in 210. With the exception of those cases which show no change, it may be inferred that the post held in 210 is higher-ranking or more senior than the post held in 205.

Ref.	Breeze no.	Position in 205	Position in 210	Post in 205	Post in 210
a	74	1.[108]	1.[13]	C T	S T
a	75	3.[62]	3.[8]	C T	S T
a	76	6.[48]	4.[11]	C T	S T
b	77	1.[73]	1.[11]	S T	B T
b	78	3.[45]	3.[7]	S T	B T
b	79	4.[40]	7.[7]	S T	B T
c	80	2.[36]	4.[8]	S T	OP C
d	81	4.[44]	7.[10]	S T	OPT CONV
e	82	1.[3]	4.[7]	S T	TES
f	83	6.[13]	3.[6]	OP CO	TESS
g	84	3.[8]	3.[4]	TES	VEX
h	85	6.[6]	4.[6]	TES	OPT 7
i	86	2.[10]	3.[5]	OP CA	OPT 7
j	87	3.[3]	3.[3]	OPT 7	AC PR
k	88	7.[15]	3.[5]	OPT 7	VEX
l	89	4.[7]	7.[3]	VEX	VEX
m	90	6.[4]	4.[4]	VEX	OP BA
n	91	4.[6]	7.[2]	OP B	B S PR
o	92	3.[24]	3.[2]	B PR	B PR
p	93	3.[5]	3.[1]	TAB	COR PR
q	94	6.[5]	4.[1]	IMA	COR PR
r	95	6.[2]	4.[3]	IMC	AQ PR
s	96	7.[5]	5.[6]	EM B	EM B
t	97	6.[24]	4.[10]	BVC	BVC
t	98	7.[8]	5.[9]	BVC	BVC
u	99	2.[87]	2.[4]	HO	H C
v	100	6.[11]	4.[15]	ABA	BAR
w	101	7.[34]	5.[7]	EX TR	L S PR
x	102	4.[11]	7.[15]	CPC	CACVS

Set out diagrammatically, these changes appear as follows. 'o' marks the earlier and lower of each pair of posts, 'x' the later and higher.

POST	CHANGES 205 - 210																	
	a	b	c	d	e	f	g	h	i	j	k	m	n	p	q	r	v	w	x
COR PR														x	x				
TAB														o					
B S PR													x						
AQ PR																x			
IMC																o			
IMA															o				
OP BA												x	o						
AC PR										x									
VEX							x				x	o							
OPT 7								x	x	o	o								
TESS					x	x	o	o											
L S PR																		x	
B T		x			o														
OPT CA									o										
OPT CONV				x		o													
OPT C			x																
S TR	x	o	o	o															
CACVS																			x
CPC																			o
C T	o																		
BAR																	x		
EXC TR																		o	
ABAL																	o		

Thirdly, the four career inscriptions show the following sequences of posts. The references are:

1 = VI.2987 (Q.Iulius Galatus)

2 = X.3880 (C.Aecius Similis)

3 = XI.1438 (C.Virrius Lucundus)

4 = VI.37295 (ignotus)

Post	Careers			
	1	2	3	4
? emeRITVs				x
COR PR				x
COM PR				x
TAB B				x
B PR				x
B S PR				x
[mil.urb.]		x		
VEX	x		x	x
OPT 7		x	x	
TESS			x	
B T	x	x		
S T	x			
[miles]	x			

These three pieces of evidence may now be combined. They are consistent in the order in which the posts appear, and the table below sets them out alongside each other. In the sections referring to VI. 1058 the numbers indicate the number of men holding each post, and square brackets show posts listed out of normal order (Change 'v' suggests that ABAL was normally below C T, and this ambiguity is removed). In the Changes section, 'o' indicates the lower and earlier post, as before.

POST	VI. 1058							CAREERS				CHANGES 205 - 210																	
	1	2	3	4	5	6	7	1	2	3	4	a	b	c	d	e	f	g	h	i	j	k	m	n	p	q	r	v	w	x
-RITV-											x																		
COR PR			1	1							x														x	x				
COR S PR							1																							
COM PR											x																			
TAB B											x																			
TAB																									o					
B PR	1		1	1	2						x																			
B S PR							1				x													x						
PRE C	1																													
AQ PR				1	1																						x			
IMC	1																										o			
IMA																										o				
OP BA				1																			x	o						
AC PR			1																		x									
VEX	1	o	1	1	1	o	1	x		x	x							x				x	o							
OPT 7	1	o	1	1	1	o	1		x	x									x	x	o	o								
TESS	o	o	1	1	1	o	1			x						x	x	o	o											
EMB					1																									
L S PR					1																								x	
[B PR]					1																									
B T	1		1				3	x	x				x			o														
EX PR							1																							
OPT CA																				o										
OPT CONV							1								x		o													
OPT C	1			2										x																
BVC				1	1																									
S T	1	1	1	2	3	2	3	x				x	o	o	o															
[BVC]							1																							
CACVS							1																							x
CPC																														o
VNC COH							2																							
[COD]		1																												
[S T]		1																												
HC		1																												
LIB			1																											
AQA					1																									
[ABAL]	1																													
EXC						1																								
EM C							1																							
C T	1	2	2	2	1	1	1					o																		
EXC TR			1																										o	
DAR				1																								x		
ABAL			1																									o		
VICT			1																											
SIF						2																								
CAR		1																												
(miles)								x																						

5.3.4

We now relate this ordering of posts to the years of service in which the posts are attested as being held, using the conclusions of Chapter 3 (3.12. 1,2,3).

In the tables which follow, an asterisk * indicates the holding of a post in a particular year or group of years of service. In ambiguous cases, a line ——— indicates the plurality of years in which a post may have been held. The nature of the analysis of VI.1056, 1057 and 1058 is such that for the first two of these inscriptions the years of service which may be distinguished are 1,2,3,4,5,6 and 7-or-higher, while for 1058 they are 1-5,6,7,8,9,10,11 and 12-or-higher. The fourth and final table of this group therefore summarises this evidence in the only common form, i.e. 1-5, 6, and 7-or-higher.

The first table sets out the evidence of 1056 and 1057 which relates to posts which can be fitted into the order arrived at at 5.3.3; the second relates to posts which cannot be fitted into that order , and also includes the ambiguous and fragmentary abbreviations (this table is not referred to subsequently, but it will be noted that so far as it is meaningful it is consistent with the main conclusions). The third table sets out the evidence for 1058. The fourth table summarises the evidence of the first and third. Posts for which the year cannot be deduced are naturally omitted.

POST	1056							1057						
	YEAR OF							SERVICE						
	1	2	3	4	5	6	7+	1	2	3	4	5	6	7+
COR PR														*
TAB														*
B PR						*				*		*		***
AQ PR								*						*
IMC														**
IMA							**							*
OP BA														**
AC PR										*				
VEX	—						***						**	*** **
OPT							** **					*	*	*** **
TESS							** **						**	*** **
HEMB														*
B TR						*	***				*	**	***	**
EX PR	*													
OPT CA														*
OPT CONV												*		
OPT C												*		
BVC								*	*	**			*	
S TR	=	—	—	—			**	*	**	***	***		***	
CPC													*	
C TR	***							*** ***	**	=	*			
EXC TR										*				
ABAL												*	**	
VICT						*								*
SIF											—		*	

POST	1056							1057						
	YEAR OF							SERVICE						
	1	2	3	4	5	6	7+	1	2	3	4	5	6	7+
AQV							**						*	
AQCO														*
B								*						
BF														*
BS							**							
BS PR														*
C O							*							
CORT														*
..]C													*	
EM		—				*	*							
EMER							**							
EMR														*
HO								*						
KARC														*
L TR													*	
.]MI														*
O								*						
OC					—		**							
OPA												*		
ORPR														*
P B R							*							
PR PR														*
Q							*							
S		—	—	*		*								
S[.													*	
SN	*													
S PR							*							
SV													*	
?]T		—	—											
?]TR						*								
V						*								
VC							*							
VNC														*

VI.1058

POST	YEAR OF SERVICE							
	1-5	6	7	8	9	10	11	12+
COR PR								**
COR S PR							*	
B PR	**	*				*		
B S PR								*
AQ PR	*							*
OP BA								*
AC PR								*
VEX		*				*	*	*
OPT	**	*						**
TESS			*			*	*	*
EMB								*
L S PR				*				
B TR	**		*	*	*			
EX PR	*							
OPT CONV				*				
OPT C	*	*			*			
BVC		*		*			*	
S TR	*** ***	** **						
CACVS							*	
VNC COH		*			*			
HC		*						
LIB	*							
AQA			*					
EM C				*				
C TR	**** ***		*					
EXC TR	*							
BAR							*	
ABAL			*	*				
VICT		*						
SIF	**							

POST	1056			1057			1058		
	YEAR OF SERVICE								
	1-5	6	7+	1-5	6	7+	1-5	6	7+
COR PR						*			**
COR S PR									*
TAB									*
B PR		*		**		***	**	*	*
B S PR									*
AQ PR				*		*	*		*
IMC						**			
IMA			**			*			
OP BA						**			*
AC PR				*					*
VEX	*		***		**	*** **		*	***
OPT			** **	*	*	*** **	**	*	**
TESS			** **		**	*** **			** **
EMB						*			*
L S PR									*
B TR		*	***	***	***	**	**		***
EX PR	*						*		
OPT CA						*			
OPT CONV				*					*
OPT C				*			*	*	*
BVC				****	*			*	**
S TR	*** **		**	***** ****	***		*** ***	** **	
CACVS									*
CPC					*				
VNC COH								*	*
HC								*	
LIB							*		
AQA									*
EM C									*
C TR	***			****** *****			**** ***		*
EXC TR				*			*		
BAR									*
ABAL				*	**				**
VICT		*				*		*	
SIF				*	*		**		

The tables show a very good consistency. The posts fall into two categories: those normally held during the first six years of service, and those normally held later. The only post which does not show a tendency in either direction is beneficiarius tribuni. Posts above this tended to be held in the seventh year of service or later, posts below tended to be held in the first six years. Codicillarii tribuni tended to be the most junior group; secutores tribuni seem to be spread fairly evenly among the first six years. The exceptions to the pattern are clearly isolated, e.g. the vexillarius on 1056 in his first or second year, or the beneficiarius praefecti on 1057 in his third year. The system could be flexible when the need arose.

The increase in the size of the cohort in A.D.205 (see 5.2.1) does not produce any disturbance in the pattern of holding posts. The number of administrative posts probably increased.

The five tombstones which record stipendia of immunes and principales tend to confirm this analysis. This evidence is:

Post	Approx. year of service	Reference
B PR	22	VI.2966
S TR	8 & 9	VI.2987
B TR	10 & 11	"
VEX	12, 13 & 14	"
B TR	9	VI.1988
VEX	7	XI.1438
OPT	before 7	"
TESS	before 7	"
TESS	11	XI.3520

The career on VI.2987 seems to be somewhat slower than was normal.

The immunes and principales on VI.220 and 221 are listed broadly in accordance with the order set out at the end of 5.3.3, if we allow for a plurality of centuries on 220 and read the left column of 221 before the right. There are divergences, however, which are explicable by the date of these inscriptions (203 and 113 respectively); being earlier than the change to listing according to rank (as on VI.1058 of A.D.210), they list according to length of service (as on VI.1056 and 1057).

5.3.6

Breeze (1970,I,80) comments that VI.1057 and 1058 "probably provide more problems than they actually solve." The analysis just completed shows that they are, in fact, our only reliable evidence for the career structure of immunes and principales in the Vigiles. The career inscriptions turn out to show a very small part of the picture. The double career system, with most of the men serving just six years, and with a small minority staying on much longer (and in some cases for a career as long as a normal military one), is unique to the Vigiles, and cannot be evidenced by inscriptions which record only or chiefly careers other than as plain rankers. A view must be taken of the normal length of service; six years fits the best. But even if one disagrees over the actual length, the fact remains that the longest-serving vigiles tend to be immunes and principales; their length of service is greater than that of most of the rankers.

5.3.7

The flexibility of the system is also a feature which this new analysis brings to light. The opportunity to advance men rapidly or retain them for a number of years in a post arose mainly from the relatively short normal term of service. Six years was long enough to

spot and train talent, and was short enough to enable failures to leave without much positive action; and after six years each man who stayed on could be subject to regular review. It is possible that more positive action was necessary to retain the men than to get rid of them; the high annual loss rate of over 10% (3.11.2; 5.2.10) included *immunes* and *principales*. Early and rapid promotions made up for the lack of a large pool of men still developing after six years, such as existed in the rest of the army.

5.3.7

In a force whose primary purpose was firefighting, a clear distinction cannot be made between firemen and non-firemen. There were, however, certain specialists. The technicians, *siphonarius*, *unc(in)arius cohortis* and *bucinator*, tended to be low-ranking, though they might serve beyond six years. The *optio ballistae* (*-arum*) was more senior. The *optio* and *tesserarius*, who will have taken charge at many of the fires (cf.4.29.5), tended to have several years of service to their credit, and were probably selected as good firefighting officers. There were thus very few openings for specialist firemen. Among the administration, there was some scope for development on the staff of the tribune (*codicillarius*, *secutor*, *beneficiarius*), but *beneficiarius tribuni* was the end of the line for most. For those who rose higher, a career longer than six years was normal, with another bar at *beneficiarius praefecti*. The table at 5.3.3, complex though it may appear, does not represent a career with multiple opportunities. A specialist fireman as such could find only limited scope; if he aimed for higher rank, he had to go onto the administrative side. But a good man could be retained for years in a post where his potential matched the needs of the system. The *optio*, in particular, is likely to have been a key man in firefighting.

5.4.1

There were 49 centurions in the Vigiles, seven in each cohort, and the size of the century was 60 - 80 men, raised in A.D.205 to 120 - 160 (5.2.1). These centurions formed a very small proportion of the total number of centurions in the whole of the forces, some 2,000, and a little over one third of the total number of centurions serving in the units at Rome. After completing their time in the Vigiles, the centurions went on to serve in the other units at Rome: the Statores (sometimes), the Urbans and the Praetorians; some eventually went out to the legions and attained the primipilate. Centurions as a group are one of the more neglected areas of Roman military studies to date. The studies on which this section is based are those of Birley (1941, 1965, 1967), Dobson (1970 and 1972), Dobson and Breeze (1969), and Breeze (1971).

5.4.2

The source which supplied centurions for the Vigiles is of considerable interest (Dobson and Breeze 1969). In general, centurions came from limited areas: promoted from the ranks of the legions (the largest proportion), promoted from the ranks of the units at Rome after serving as cornicularii of the pratorian prefect or of the praefectus vigilum or of the praefectus annonae, promoted from the body of evocati having served 16 years with the praetorians, or having been directly commissioned being already equites (i.e. ex equite Romano). Centurions in the Vigiles were drawn from one area only: evocati. Evocati who went straight to a legionary centurionate (only a small number) did not return to Rome as centurions, though they might return as primipilares to hold the tribunate. The promotion from cornicularius praefecti vigilum is attested twice only. One of the men, Aetrius Ferox (XI.5693 =

D.2666, time of Antoninus Pius), describes himself as the first man so promoted, and he went to a legion; the other man, Caecilius Rufus, (VI.414b), took the same path, a little later (A.D.191). Such promotions, from corniculariі of the Rome prefects (other than Urban) to legionary centurionates, were not uncommon, but what distinguishes the Vigiles is the fewness and lateness of the known examples. No centurion in the Vigiles had served in the ranks of the Vigiles. In this the Vigiles resembled the Urban cohorts, but not the Praetorian, since in due course former evocati returned to the Praetorians as centurions. Also, no centurion in the Vigiles had previously served as a legionary centurion. Men who received direct commissions as centurions served at once in a legion and when they did come to Rome they omitted the Vigiles from their cursus and went straight into the Urbans; they seem similarly to have by-passed the Statores. Legionary centurions who had risen from the ranks of the legions did not go to Rome to serve as centurions.

5.4.3

The pattern which thus emerges is consistent with the nature of the duties in the Vigiles. The certainty of continuous night duty overlain with the duty of fighting fires must have been regarded as a chore; and in addition the men were a non-fighting corps of freedmen, the class normally barred from military service. These factors will explain the lack of centurions with direct commissions. The positive choice of former praetorians is explicable by their previous experience, since their sixteen years' service must have given them an intimate knowledge of the City and also, probably, occasional experience of firefighting in conjunction with the Vigiles (cf. 4.12.2).

In addition, the operation of the administration will itself have tended to reinforce this choice, with convenience ensuring that evocati, who were already in Rome, served in the Vigiles and the other Rome units before going out to legions, nor should we overlook the possibility of personal favour and influence in Rome itself affecting a man's career and letting him serve first in an area subject to such influence. Such factors as these are likely to have influenced the men with direct commissions also, in their case letting them serve first in legions subject to particular areas of patronage. What is important is that any type of man could have been got to Rome to serve as centurion in the Vigiles: the evocati were chosen partly for their previous experience and partly because they could conveniently be assigned to this chore.

5.4.4

These centurions, like most of the legionary centurions, would probably have been in their late thirties or a little older when they attained this rank. But their average age must have been much lower than that of legionary centurions, since the centurionate in the Vigiles was just the first stage of a cursus whereas it was possible to hold one legionary centurionate after another with about equal chances of dying still a centurion or being promoted to primuspilus and thence on to primipilaris posts.

5.4.5

For the pay of the centurions in the Vigiles, it is necessary to work out to which pay grades various posts should be assigned, bearing in mind that promotion in the Roman system was not necessarily accompanied by an increase in pay, and so to reach actual figures (Dobson 1972, especially 206f). Our major guide is the career pattern of evocati who went either to

a legionary centurionate or to a centurionate in the Vigiles: "There is nothing here to suggest that the legionary centurion was paid less or more than the centurion in the vigiles, and it seems fair to suppose that both were paid the same" (Dobson 1972, 206). Further promotions to centurionates in the Urbans and the Praetorians were not, in this scheme, accompanied by increases in pay, but the next promotion, to a post in the legionary primi ordines, did bring an increase in pay, and so did the next promotion, to primuspilus. In Rome, the only promotions which probably did bring increases in pay were promotions to the equivalent of primi ordines in a legion, that is, the senior posts in the Guard (primus ordo, trecenarius, princeps castrorum); these, when held, were normally followed by a legionary centurionate in the primi ordines before going on to the primipilate. The pay of centurions in the Vigiles is thus taken to be as follows (Dobson 1972, 203):

Augustus to Domitian	15,000 sesterces
Domitian to Severus	20,000 sesterces
Severus to Caracalla	30,000 sesterces
Caracalla onwards	50,000 sesterces

Primi ordines received double these amounts, primipili four times. Despite their parity with legionary centurions, centurions in the Vigiles were probably better off because of donatives and other perks.

5.4.6

There is no direct evidence to indicate how long centurions served in the Vigiles. In particular, no centurion is attested at two precise dates while serving in the Vigiles, and the probable lengths of service have to be guessed at. The strongest indication is based on the

throughput of centurions in the Rome units. This is because the majority of the centurions in Rome were former *evocati* whose first post as centurion was held in the *Vigiles*, before they went on to the Urbans and Praetorians, whereas only a small proportion of centurions in the Urbans and Praetorians had earlier received direct commissions as legionary centurions and subsequently omitted the *Vigiles* from their cursus. The clearest career for the present purpose is that of C. Caesernius Senecio, attested on VI.1057 as centurion of the Fifth Cohort of *Vigiles* in 205, who may be identified with the C. Cesennius Senecio commemorated on VI.2464 = D.2089 who died in Britain during Severus' campaigns. His successive posts are given as: *7 vig*, *7 urb*, *7 pr*, *exercitator equitum pr*. It was presumably in this last post that he went to Britain in 208. Given that VI.1057 is datable to 205 (5.2.5) and that Senecio received his last promotion probably by midsummer of 208, there are three complete years in which he finished in the *Vigiles*, held two posts, and started as *exercitator equitum*. At most, therefore, the average tenure of the intervening posts is $1\frac{1}{2}$ years. Another indication, less precise than the foregoing, is provided by M. Lollius Venator, who dedicated an altar as centurion of *legio II Augusta* at Piercebridge around A.D.217 (Birley 1967). If, as seems probable he is to be identified with the centurion Venator on VI.1063 (coh. VI vigilum, A.D.212), then in five years he completed his period in the *Vigiles*, passed through the Urban and Praetorian units, and went out to *legio II Augusta*. Again, this attests fairly short periods in the Rome units, at most an average of two years. It may therefore be significant that none of the four extant names of the centurions on VI.1058 is the same as the corresponding name on 1057, five years earlier, though in view of the shortness of tenures suggested by the careers of Senecio and Venator it may be more probable that the centurions on 1058 are not the direct

successors of those on 1057 but are rather the successors of the successors. There are, however three considerations which must qualify any estimates of the length of tenure of centurionates in Rome. First, there could not be a numerical regularity in passage through the Rome centurionates, owing to the bottleneck part-way through. The numbers are estimated as follows (Dobson and Breeze 1969, p.116 n.42):

Vigiles	49 centurions
Urbans	24 centurions (assuming that the two cohorts outside Rome had their own arrangements)
Praetorians	60 centurions

The effect of this bottleneck was accentuated by the fact that men ex equite Romano entered the Rome units at that narrowest point. This numerical pattern provided a ready mechanism both for delaying the promotion of slow developers and also for enabling a centurion who was so inclined to develop his potential as a specialist fire officer. Secondly, the length of tenure of the centurionate may have been subject to variations according to period (Dobson and Breeze 1969, 115): on this aspect, there is a lack of information. Thirdly, men who went on to become primuspilus normally held only one legionary centurionate between leaving Rome and becoming primuspilus; the short period as a legionary centurion looks like an induction into the ways of the legion before tenure of the senior centurionate, and the latter looks like a reward for good service in Rome. Though there was a better chance of becoming primuspilus after service at Rome than after service just in a legion, the men who did progress in this way rarely proceeded further: they made their career at Rome. Thus "the temptation to think of a rapid transit must be resisted" (Dobson and Breeze 1969 , 107). It was possible (and could even have been unremarkable) for a centurion to become a really good specialist fire officer and make this his life.

5.5.1

The tribunes commanded the cohorts, and each had charge of one castra and two excubitoria. In addition, one of the tribunes was detached to take charge of the vexillation at Ostia, acquiring the title praepositus vexillationis late in the second century. This duty fell upon the various cohorts (see 4.29.4). A primipilaris seems to have stood in for the tribune as curator cohortis (VI.3909). 5.5.2

The normal system for providing tribunes has been elucidated by B.Dobson (1970 and 1974). The men were primipilares, selected from "the cream of the centurionate" which was itself "the great repository of fighting and administrative experience" (1970, 100 & 115). The evidence shows that men ex equite Romano - the group who at an earlier stage in their careers enjoyed the privilege of omitting the centurionate of the Vigiles and proceeding direct to the Urbans (5.4.2,3) - now had to take their turn in the Vigiles (1974,419). Established now as primipilares, the original distinction was meaningless. Moreover, at this stage there was a much greater element of individual selection. Occasionally men did omit the tribunate of the Vigiles or of the Urban Cohorts, but the explanation is still to seek (1974,418). The minimum age of the tribunes was usually around 50 (1970,102). Tenure of the tribunate was probably about a year for men destined to be procurators and prefects, but could have been much longer for others (1974,418f).

5.5.3

The background of these men guaranteed their political reliability. It also provided them with opportunities for firefighting as legionary centurions, and it is quite possible that a man who had been involved in firefighting in war conditions (cf. 7.9) came to the Vigiles with a much better experience than many of the centurions in the Vigiles had

been able to obtain as Praetorian rankers. Even if the ex-Praetorian had had experience of firefighting, whether in war or through assisting the Vigiles in Rome, the tribune still had the edge, since he had been a centurion. The tribunes thus may well have brought crucial experience to the Vigiles, and could have played a key role in maintaining the standards of firefighting.

5.6.1

The subprefect did not have a command of a specific firefighting unit, but from references on inscriptions was clearly in charge in a general sense but secondary to the prefect. He seems to have acquired special duties which took him to Ostia from A.D.207 or a little earlier (see 4.29.3). It is probable that his duties were more closely allied to those of the prefect than those of the corps (see also 7.7 and 8.1.3). It is possible that a curator cohortium stood in for the subprefect (VI.1092, cf. BR p.37 n.1 for summary of conflicting interpretations).

5.6.2

The majority of subprefects are known to us simply as names. The list given by BR (Appendix A) may be largely updated by reference to Pflaum (1961), and the following is a summary giving the names of subprefects and dates attested:

113	C Maesius Tertius
156	T Flavius Anterotianus
before 158	T Desticius Severus
168	-er -to (XIV.4500)
175	Ulpius Archelaus
under Aurelius	T Alfenus Senecio
181	C Sempronius Urbanus
191	Orbius Laetianus

under Severus	Ti Claudius Zeno Ulpianus
203	C Iunius Balbus
c.203	- (erased: XIV.4385)
207	C Laecanius Novatillianus
?210,?212	M Firmius Amyntianus
217	Flavius Lupus
239	Aelius Spectatus
241	Marcius Montanus
period 241-244	Valerius Alexander
first part C3	Valerius Titus
C3	Salvius Salvianus
?	-erius (E.E.vii,1213)

5.6.3

The post of subpraefectus vigilum was lower echelon centenarian in the equestrian hierarchy (Pflaum 1950,233). It followed posts in the equestrian militiae, and the men who went to centenarian posts rather than sexagenarian tended to be more successful and to have established more influential connections (Pflaum 1950,217,218,226); they did not necessarily, however, reach the top (ibid.217). Men who served as subpraefecti vigilum, in fact, tended in their later careers to just miss the key positions, and none became praefecti vigilum. The fact that they progressed should, however, remind us that they were by no means without ability (ibid.214).

5.6.4

Their previous posts, praefectus cohortis, tribunus militum and praefectus alae, could have provided them with opportunities for firefighting which would have been a good preparation for service in the Vigiles. It may doubted, however, whether they personally did much firefighting in the Vigiles. Their place in the organisation is more

closely tied to that of the prefect than to individual cohorts, and since they were younger than the tribunes - often considerably so (Pflaum 1950,211 and 213) - and with less military experience, they probably lacked in firefighting auctoritas. In the only two cases where special aptitude or interest may be discerned, the subprefects specialised in law. C Laecanius Novatillianus is described as "iuris perito"(VI.1621); and Ti.Claudius Zeno Ulpianus may be inferred to have been a lawyer (XI.6337): "adhibi(to) in consil(ium) praef(ecti) praet(orio) item urb(is)".

5.6.5

The length of tenure is not known. The maximum possible average period, based on the number of subprefects attested in the period 113 to 244 is about 7 years, but gaps in our knowledge and the number attested in the first decade or so of the third century tend to suggest that the maximum average was nearer three years.

5.6.6

The picture which emerges of the subprefect is of a capable and reasonably young man acting as number two to the prefect in an administrative and judicial capacity. In Ostia he probably did much of the work which would have fallen to the prefect. Any firefighting was probably only occasional and in emergencies. It may be surmised that his period in the Vigiles provided the aspiring equestrian with a very sound knowledge and experience of administration, building on the foundations previously acquired in the army, "le séminaire de l'administration équestre" (Pflaum 1950,182).

The post may well have been instituted by Trajan.

5.7.1

The praefectus vigilum had overall charge of all the operations of the Vigiles and in addition had judicial functions (7.7, 8.1.3). The prefect was the personal representative of the Emperor, and ranked above the palatine posts and about equal to the praefectus annonae. It is well established that the prefect had a post of considerable political potential, with a force of 3,500 or 7,000 men at his disposal who were as good as armed, and occasionally this position was exploited. This political aspect should not be lost sight of, and in suggesting that the Vigiles were primarily a fire brigade this thesis does not seek in any way to diminish this aspect.

5.7.2

The eminence of the post, near the peak of the equestrian system, ensured a supply of excellent men. (In general see Pflaum 1950 and 1961). There is not a fixed pattern in the appointments, rather appointments were in accordance with individual circumstances (Pflaum 1950,295,257). The majority of prefects probably had a combination of military and administrative experience, and may have had opportunities for firefighting in their military service. Some, like Rustius Rufinus, will actually have served in the Vigiles as tribune, and others may have served in the Vigiles as centurions. Those who had been procurator governors and prefects of a fleet may be considered predominantly military in background. The prefect was probably concerned less with firefighting than the other officers in the Vigiles, and more with judicial matters, in which he was assisted by the sub-prefect. The prefect was in the same general age group as the tribunes.

Pflaum (1961,264) seems to suggest that in selecting prefects there was a preference for men who had been a libellis, because both posts were concerned with law. There does not seem to be any explicit evidence for this preference, and such evidence as does exist for the post which preceded praefectus vigilum tends to contradict the idea. Preceding attested posts are listed in the next section, together with evidence for two legal specialists.

5.7.3

The list of prefects given by BR (Appendix A) can be supplemented and some corrections incorporated. The check list which follows is mainly based on BR and Pflaum (1961).

under Tiberius	C- Ai- Fla-	
31	P Graecinius Laco	
48	Decrius Calpurnianus	
54	Iulius Paelignus Laelianus	
62	Sofonius Tigellinus	
before 65	Annaeus Serenus	
69	Plotius Firmus	
Vesp or Titus	C Tettius Africanus	
under Trajan	Cn Octavius Titinius Capito	
111-113	Q Rammius Martialis	
119	T Haterius Nepos	
149	-]cordem	(A.E.1971,33)
under Pius	C Tattius Maximus	
168	M Bassaeus Rufus	
under Aurelius	Umbricius Aemilianus	
175	Q Cervidius Scaevola	
181	Sempronius Laetus	
190/?1	Aelius Iulianus	
190/?1	Clodius Catullus	
under Severus	P Cassius	
199-200	T Flavius Magnus	
203-5	C Iunius Rufus	
205-7	Cn Marcius Rustius Rufinus	
210-11	C Iulius Quintilianus	
?210, ?212	M Aurelius Va-	

Severus-Caracalla	Ti Claudius Vibianus Tertullus
212	Cerellius Apollinaris
217	Valerius Titanianus
Heliogabalus	Cordius (? = the following)
?221 or 222	Aurelius Concordius
223	C Iulius Paternus
225	Cr- Severinus
?226	Aelius Florianus
period 226-244	Herrennius Modestinus
239	- (erased: XIV.4397)
241	-ltius Philippus
period 241-244	Valerius Valens
?244	Faltonius Restitutianus
?	Sempronianus
c.258	L Petronius Taurus Volusianus
269	Iulius Placidianus
under Constantine	Poltumius Isidorus
period 333-337	Rupilius Pisonianus
between Diocletian & Valentinian	Aurelius Maximilianus
period 375-383	Flavius Maximus
late	P Aelius Apollinaris
after Severus Alexander	Priscus S- (VI.1628)

Preceding attested posts:

	Cn Octavius Titinius Capito	ab epistulis
	T Haterius Nepos	a censibus et libellis
	M Bassaeus Rufus	a rationibus
N.B.	Q Cervidius Scaevola	"praecipue iuris perito" (SHA Marci 11.10)
	Cn Marcius Rustius Rufinus	praepositus annonae
	Ti Claudius Vibianus Tertullus	a rationibus
N.B.	Herrennius Modestinus	"iuris consultus" (VI.266)
	L Petronius Taurus Volusianus	trib. coh. praet.
	Priscus S-	mag. a libellis

5.7.4

Forty prefects are attested up to A.D.269, a period of 263 years. The maximum possible average tenure of the post is therefore $6\frac{1}{2}$ years; but the sequence of prefects attested around the first decade of the third century suggests that the period could actually be under 2 years. With a post of this nature, we should not expect a fixed period.

5.8.1

In examining the personnel of the Vigiles, we have noted the areas in which it was possible for specialists to develop, and have also noted that specialists were relatively few. The short period of normal service in the ranks and the overall demands of the military system on the progression of officers were two limiting factors, but so also was the continuous night duty which led to a high wastage among the men. Centurions, immunes and principales, and rankers could, if they were exceptional, make a life-long career in the Vigiles. How far firefighting prowess was likely to be a factor in selection for promotion is a crucial question which is reserved for discussion in Chapter 8.

The provision of four doctors for the Fifth Cohort (VI.1058) indicates good provision for injuries.

CHAPTER 6

THE FIRE STATIONS

6.1.1

The Vigiles are known to have had 23 fire stations. The main ones, where the men lived, were called castra (XIV. 4381 and 4387), and there were 7 of these in Rome and one each at Ostia and Portus. In addition, just in Rome, there were 14 sub-stations, or excubitoria (the name is given by VI.3010 and the Notitia Urbis [Nordh, 1949, 105]). There seems to be no direct authority for the name statio vigilum, which has been current since the sixteenth century and has become firmly established in modern usage together with the Italian stazione. Figure 26 shows the location of the four castra and the one excubitorium which have been identified with certainty in Rome. The significance of this distribution is considered below (at 7.10). This chapter looks at the fire stations as buildings.

6.1.2

Despite modern assertions to the contrary (e.g. BR pp. 47, 49, 52 and 53), it is not necessarily true that the Vigiles were stationed in the same places as their Republican predecessors. Paulus (Dig.1.15.1) describes the Republican familia publica as "circa portas et muros disposita". Leaving aside the metaphorical portae of the customs bar and the customs murus (if it existed: see Richmond, 1930,7), the only possible candidate for the disposition of the familia publica is the Servian wall. Paulus did not, however, believe that the Vigiles were stationed in the same places. His actual words are (Dig. 1.15.3): "itaque septem cohortes opportunis locis constituit, ut binas regiones

urbis unaquaeque cohors tueatur . . " This implies that Augustus placed the cohorts where they were needed. Moreover, it would be odd if the Servian wall had had any influence on their disposition. Not merely would it have been mere antiquarianism to follow the line of a wall which was largely obscured (Dion.Hal. Ant.Rom.4.12), but the recently-created 14 Regions, among which the Vigiles were distributed, positively ignored the Servian wall. Thus, while it may be legitimate to conclude continuity near one spot (as does Colini, 1944, 231, with regard to the Fifth Cohort), it is not legitimate to use proximity to a Servian gate as an argument for identification, nor distance from a Servian gate as an argument for not identifying remains as a castra or excubitorium vigilum.

6.1.3

The locations of the fire stations are known only partly, and vaguely, from the Notitia Urbis; the castra vigilum do not as such appear in it at all (see Appendix II), and the excubitoria are not actually assigned to Regions by it. Our good information is largely archaeological, both discoveries of the actual stations and also the findspots of informative inscriptions. Where information was available, De Rossi (1858) remains unsurpassed, though a certain amount of research has been needed to translate his nomenclature of places and buildings in Rome into the current nomenclature. The two most informative stations, the excubitorium in Trastevere and the castra at Ostia, were discovered after he wrote, and consequently he is rather thin on the nature of the fire stations. BR tracked down most of the scattered information available to him, but unfortunately he is not sufficiently rigorous in assessing the value of the evidence and produces inconsistencies and non sequiturs. On all major points concerning

fire stations there is little, if anything, to add to BR by way of basic evidence. It is, however, possible to make far more sense of the evidence, and even to suggest that the castra vigilum are a distinct type of building. First, we examine the evidence for each station in turn.

6.2.1

The castra of the First Cohort were located below the palazzo Muti, to the east of S. Marcello al Corso (Figure 27). Five inscriptions of the Vigiles can be shown to have come from there, three of them specifically mentioning the First Cohort. There is very little information about the plan of the castra.

The earliest account of discoveries on the site is also the longest: Cod. Vat. Lat. 9141 f.143 verso, by Holstein, published by De Rossi (1858, 269f.):

"Delle sudette cohorti finhora nissun antiquario ha saputo dire in che luogo fossero le stationi, o che forma d'edificio fossero, ma al tempo nostro con l'occasione della fabrica nuova che fa il sig. Cavagliere Giovanni Battista Muti nella Casa hereditaria della sua famiglia, si e scoperta una parte grandissima di una delle dette stationi, con diverse stanze ed appartamenti ornati con colonne, pedestalli e statoe, parte incrostati intorno con marmo, parte intonicate con la calce, con sedili o muricciuoli da sedere, coperti pur con tavolozze di marmo segato. E vi sono trovate diverse inscrittioni antiche, che di tutto questo ci fanno fede, e mostrano come appunto in quel luogo anticamente fosse la statione della prima cohorte o vero de'vigili primano, che servivano per la settima regione, detta Via lata, che fin hora ivi appresso retiene il nome. Mostrano anco che in quella prima statione oltra il Tribuno o Capitano dimorasse anco il prefetto stesso. L'inscrittioni sono queste:

La prima in un piedestallo grande e bello.
[text of VI.233]
In una tavola di marmo rotto.
[text of VI.1092]
Questa pure si legge in una tavola di marmo rotto de' tempi assai bassi.
[text of VI.1226] "

233 is dedicated by a praefectus vigilum, Aurelius Maximilianus, to the genius of the First Cohort, and 1092, a dedication to Gordian III, includes among its dedicators a tribune of the First Cohort; 1226, dedicated by a prefect and sub-prefect of the Vigiles, [illegible] Concordius and Salvianus, to an Augustus, has no indication of cohort.

The first publication concerning the castra was Tav. X of Bellori's Vestigia veteris Romae (1673), the first printed edition of the Severan Marble Plan of Rome. This showed the fragments of the Plan (no. 36) which for just over two and a half centuries remained identified as the castra of the First Cohort. BR shows them in his Plate II; Piante shows this section of Bellori's map as Pianta I.10.b, Tav.II. Later knowledge of the topography of that area showed that these fragments did not fit there very easily, and slight adjustments (such as those of Jordan and Richter, moving them to the west of the Via Lata) were not improvements (Hülsen 1893, 131-4). Finally, however, Gatti (1934) identified these fragments as the Horrea Galbana, just east of the porticus Aemilia. In this position, the fragments correspond with sufficiently extensive archaeological discoveries to make the attribution certain. Gatti shows their new position in his Tav. II, and the area is shown with more of the surrounding fragments in Piante, Pianta I.7, Tav. 8.

It is something of a mystery why Bellori decided that these fragments represented the castra of the First Cohort. It is possible that he was influenced by Ligorio's notion that the castra of the Fifth Cohort on the Celio was a large courtyard building (see 6.2.5 and 6.5.3), but this possibility only raises the further question, why Bellori identified the fragments as the castra of the First Cohort in preference to any other cohort. In view of the fairly short interval between the date of his publication, 1673, and the date of the discoveries beneath the Palazzo Muti, completed in 1644, we can speculate that the fragments did in fact seem to represent what had been seen. This is, admittedly, speculation: but it would explain what otherwise appears to be inexplicable.

Another inscription is assignable to this area, VI. 1157. This is dedicated to Constans by Rupilius Pisonianus, praefectus vigilum. First published by Fabretti (1699, p.683, no. 75), it is given the provenance "apud Mutium" in the Cod.Barb.XXX,182,p.103' (De Rossi, 1858, p.274, n.2): the site of the earlier discoveries.

Fabretti also published the text of a copy of VI.1056 (260ff., no. 91). This inscription has a more complicated history than the others of the First Cohort, by whom it was set up. Marini (1785, 206) explains that the original base used to stand in the garden of the Casa Barberini, whence it was moved to the Palazzo Barberini, and that it was the text of the original inscription which Tezio published, without noting a findspot, in his Aedes Barberinae (1642). The copy from which Fabretti published a text was in the Palazzo Muti, and in Marini's own day it stood in the Villa Albani (where it remains today). It was a poor copy, based in part on Tezio's

published text. Fabretti did not indicate that his inscription was a copy. With this information before him, De Rossi (1858,271f.) surmised that the original base had been discovered below the Palazzo Muti, and the copy made when the original was moved to the Palazzo Barberini. Certainly the text of the inscription is consistent with a dedication in the castra of the First Cohort. The date of its first publication, 1642, is interesting, since it is probable that it was discovered during the same building operations as those recorded by Holstein. If so, Holstein's first sentence and his failure to record it will imply that 1056 was discovered after he had written his own report.

The only suggestion that we might have a plan of part of the castra was made by Mancini (1912,337), and Gatti (1934,124) felt that he could not exclude this possibility. The remains in question were to the north and east of the church of S.Marcello al Corso (see Figures 27 and 28). Albarelli (1913,116-124) gives further information, which is admittedly more detailed than Mancini but is still inadequate for a full interpretation. However, only the lowest walls could have belonged to the castra, together with the lowest pavement (Krautheimer, 1912,212). The records have just one merit, that in showing how these earliest walls were positioned, they imply that the west end of the castra would pass beneath the present chancel of the church. Such an occurrence is unlikely, since under or very near the church would have been the house of Lucina, in which Marcellus founded the titulus. The foundation took place during the papacy of Marcellus (= Marcellinus) in the period 296-304 (Röttges, 1956,385ff.), at which period the Vigiles were still in existence and presumably in their castra. It is therefore almost certain that the castra stopped short somewhere east of the church, and these remains are therefore irrelevant to the castra.

More walls with vaults and arches and a large quantity of marble were seen in 1844 below the Palazzo Muti (Sarti, 1886,438). No plan has come down to us. In 1852 the discovery of VI.1725 and 1736 from the same area did not bring with it any sign of the Vigiles (De Rossi, 1858,278). De Rossi (1852,184) suggests, plausibly, that these inscriptions, which have no connection with the Vigiles, were brought there from Trajan's Forum.

Apart from the five inscriptions concerning the Vigiles which we know to have come from the castra below the Palazzo Muti (i.e. VI.233, 1056, 1092, 1157 and 1226), there are others which might have come from there. VI.2961, dedicated by a centurion of the First Cohort, C.Iulius Secundus, "sibi collegisque suis et futuris", would be appropriate for a castra (or just possibly an excubitorium). Its findspot, however, is unknown. First recorded in the Villa Albani in the 1869 catalogue (Visconti, Fea, Morcelli, 1869), it is grouped with the later additions to the collection, presumably of the nineteenth century. There is no reason for supposing that it was taken to the Villa Albani at the same time as the copy of VI.1056.

De Rossi (1858,274) suggested that VI.1144, 1180 and 1181 formed a series, with 1157 and 1226, of inscriptions set up by praefecti vigilum in conjunction with statues or busts of emperors, on the side of the castra facing the porticus Constantiniana. None of these three, however, indicates a cohort, and, unlike 1157 and 1226, the original locations are unknown. 1144 was first noted "in hortis Farnesiis", which was a collecting place for inscriptions, while 1180 and 1181 were first noted in S.Anastasia in Trastevere (Cod.Barb.182,37 and 79). Arguing simply from proximity, these two

latter inscriptions are more likely to have been set up in a building of the Seventh Cohort. Thus both the texts of these inscriptions and also what may be deduced of their origins tend not to support De Rossi's suggestion.

The result of this discussion, despite what seemed at first to be a promising amount of evidence, is that we have no plan of the castra and only vague verbal reports. There is no reason, however, for doubting that the castra of the First Cohort are in the place traditionally assigned to them. Nothing is known of the excubitoria of the First Cohort.

6.2.2

We hear only incidentally of the discovery of the castra of the Second Cohort. In connection with the discovery of what he took to be the castra of the Fifth Cohort, Ligorio noted that the castra on the Esquiline had been disinterred and levelled in his own day (see 6.2.5 and 6.5.1-3). This in entirely plausible, since at that period, in 1550, the statue base set up by the Second Cohort, VI.1059, had been discovered. Ligorio knew of its existence and its findspot from Smetius (CIL.VI.1059,n.), though Smetius did not mention the castra specifically; Ligorio must have learned of its plan by other means. Two more inscriptions, VI.414 a and b, were discovered in 1734, coming from a shrine of the Second Cohort. All these three inscriptions are from the same area: a little to the south-east of the Piazza Vittorio Emmanuele.

A very brief description comes to us from Ficoroni (De Rossi, 1858,282): "un avanzo di vasto edifizio, dove erano incastrate due tavole di marmo scritte" (i.e. VI.414 a and b). This tells us hardly

anything. The strongest evidence for the nature of the building is the fact that Ligorio saw a resemblance between it and the remains which he saw on the Celio and of which he left a written description. This resemblance is crucial for our understanding of *castra vigilum* and is discussed fully in section 6.5 .

Nothing is known of the *excubitoria* of the Second Cohort.

6.2.3

On the *castra* of the Third Cohort, there is no evidence to add to what appears in BR (48-51), though we should add some precision to the discussion. In fact, there is so little evidence that we cannot advance beyond the position of De Rossi (1858,285), who does not even suggest possibilities for identification.

The findspot of VI.3761, dedicated to Severus by T.Flavius Magnus, *praefectus vigilum*, and found near the Baths of Diocletian, led Lanciani (1876,174 and Tav.XVIII) to suggest that the remains of a courtyard building, paved with marble and with rows of rooms ("celle") along two sides, should be identified as an *excubitorium*, it being too small for a *castra*. He claimed that the "feritoie" - loopholes - were typical of Urban military buildings, but in fact they could well have been ordinary ventilators, such as are found in *horrea* (Rickman 1971, 81). He also described the courtyard as "vasto", and his plan shows it to have been about 12 metres wide: this is comparable with that of the Ostian *castra*, but even the Ostian *castra* would not fit into the space available and the Roman *castra* must have been bigger. Also, we should not forget that we do not know what an *excubitorium* looked like (unless it was a converted private house: see 6.2.7).

Moreover, as BR points out, 3761 need not have been set up in a fire station at all; it could just as well have been set up in Magnus' own house, or in any public place.

The other identification which BR mentions is the building in which was found the fragmentary inscription VI.3908. This building consisted of three double rows of tabernae, superficially resembling frag.36 of the Severan Marble Plan (see 6.2.1; BR Plate II). The resemblance is, however, irrelevant, since frag.36 has no connection with the Vigiles. Lanciani (1876,107 and Tavv.XVI-XVII) actually identified the building as the Ten Tabernae, an odd suggestion in view of the several decades of tabernae which it contained, though possibly with more merit than the fire station suggestion.

BR ended his discussion inconclusively, and we must end negatively.

6.2.4

The location of the castra of the Fourth Cohort is known fairly precisely, and there is little to add to the accounts of De Rossi and BR. The findspot of VI.220, a bronze tablet dedicated to the genius of a century, clearly names officers of the Vigiles though without indicating the cohort, and those of VI.219 and 1055 both of which do name the Fourth Cohort, all indicate the area around the church of S.Saba, on the Aventine, possibly extending a little to the west of the church. VI.219, the dedication on an aedicula, was found "a dextra clivi quo ad S.Sabbae ascenditur" (CIL.VI.219,n.), and the probability is that this aedicula was situated within the castra. VI.643, which is incomplete but does record a tribune of the

Fourth Cohort and also one of the centurions recorded on 1055, (M. Aurelius Tato), was found in the nearby church of S. Alexius.

Despite excavations below the church of S. Saba there are no excavated remains which may with certainty be attributed to the *castra vigilum*. The plan of the excavations in *Not. Sc.* 1902, facing page 270, shows that the extent of the work was too limited to permit interpretation, as indeed Cannizzaro admitted (1901, p. 11). From the reports of Cannizzaro (1901, 11 and 14), and Gavini (1902, 204-206) and Gatti (1902, 270-3, 357), there are only two items of obvious relevance to the *Vigiles*. One of them is the discovery of the inscription VI. 32795, which was found below the church, though not in a securely-interpreted context. The other is a report of enormous blocks of travertine, used in the foundation of the cosmatesque church, "evidentemente provenienti da un grandioso edificio romano" (Cannizzaro), together with a great number of marble tiles bearing numbers and also many architectural fragments. This report is very similar to the report of the discoveries of 1844 of the *castra* of the First Cohort (Sarti 1886, 438: see 6.2.1), suggesting impressive buildings with lots of marble.

Nothing is known of the *excubitoria* of the Fourth Cohort.

6.2.5

The Fifth Cohort provides us with our best archaeological information about *castra vigilum* in the city of Rome. Not merely do the findspots of four inscriptions indicate the location, but in addition we have part of the plan. Colini (1944, 228-231) gives a good review of the archaeological evidence.

VI. 222 is given the provenance "Romae, in Monte Coelio ad D. Stephani, prope navicellam" by Manutius (1566, 138). VI. 221, found in 1735, came from the Villa Mattei (De Rossi, 1858, p.290, n.2). VI. 1057 and 1058 were found in 1820, "in villa Matthaeiorum Caelimonyana ea parte, quae introeunti tibi per portam horti majorem ad manum sinistram est" (Kellermann 1835, 3). These four inscriptions all refer to the Vigiles, 222, 1057 and 1058 mentioning the Fifth Cohort explicitly. The location and surrounding area are shown in Figure 29.

The description which purports to be of this castra, written by Ligorio in the middle of the sixteenth century (Cod. Taur. V,f, 127-128), probably refers to the Macellum Magnum (Rainbird & Sear, 1972) and is discussed more fully below (6.5.1-4). The earliest account genuinely of the castra is that of Kellermann, supplemented by the manuscript plan and profiles discovered by Colini in the Biblioteca del Reale Instituto di Archeologia e Storia dell' Arte (Cat. No. 16571; Colini 1944, 228f. and fig. 191) reproduced below in Figure 30. Further excavation in 1931 revealed the row of rooms XIV in Figure 29 (using Colini's numbering), which certainly do form part of the castra, and also a row of rooms (XV) which almost certainly do not. The plan of these (in Fig. 29) is taken from Colini's Tav.XIII. The relation between the discoveries of 1820 and the row of rooms XIV is not known precisely, but Colini has plotted them plausibly (Colini 1944, 230).

Kellerman describes the findspots of 1057 and 1058 as follows (p.3):

> "Sitae erant decem vel quindecim palmas sub superficie terrae supra pavimentum arte factum, in quo immissae erant duae tabulae lapidis tiburtini, utraque foramine instructa, quae quidem insignibus cohortis infigendis inserviisse videntur."

He goes on to note that each base had two holes in the top to support a statue, and that the statues were probably about the same size as each other. With the aid of the manuscript profile we can see that 1057 (which is in one piece) was found to the north-east of 1058 (which has its base and corona separate).

Colini considered it more likely that the two travertine slabs with holes were for collecting liquids used during religious ceremonies. He also interpreted the slab underneath 1057 as the remains of a pavement running across the large room towards S. Maria. The rooms XIV measured about 3.80m x 4.90m, and opened to the west. Although Colini gives details of the type of construction he does not offer a date, while BR(p.53) records some Severan brickwork, without further description, to the south of the entrance to the garden. These may or may not be the same. The rooms XV (measuring 7m x 3.40m, with, probably, a stairwell) open to the east and lie outside the line of the rooms XIV: they probably do not form part of the same structure, even though they might have come very close to it (Colini p.230). Colini suggests that the castra might have faced east, being aligned along the road which runs beneath the modern road. In fact, however, it can be suggested more plausibly that the castra faced north (see below, 6.7.1), an argument which, like that of Colini, is not based solely on the remains of the castra. These are, in themselves, ambigious. It is in the light of our study of Ligorio that the castra of the Fifth Cohort becomes more comprehensible.

Nothing is known of the excubitoria of the Fifth Cohort.

6.2.6

It is paradoxical that the region in which the Sixth Cohort was stationed, Forum Romanum, has not produced any evidence of its stations, despite the large amount that is known of that region. VI.3909, a statue base, records a sub-prefect, and should therefore be connected with the corps of Vigiles: but it need not have been set up in a castra or excubitorium at all, and its findspot, between the temples of Julius Caesar and of Antoninus and Faustina, certainly was not a castra or excubitorium (Fiorelli 1876, 25).

BR (p.63) is right to indicate that the identification of a supposed excubitorium in the forum lacks positive evidence, though he could have gone further and said quite firmly that even "slit windows" (i.e. ventilators) are not distinctive features of fire stations. The main difficulty with excubitoria is that we do not know how to recognise them.

6.2.7

The only excubitorium which has been identified with certainty is situated in Region XIV, in Trastevere, and belonged to the Seventh Cohort. Nothing is known of the castra of this cohort. The excubitorium was discovered in 1886 and partly excavated in a private excavation. Though roofed over, the building is now in a very bad state of repair. Its main contribution to knowledge lies in the 107 graffiti found on the walls; architecturally, it contributes less than could be hoped, since the building has the form of a normal private house and was probably taken over by the Vigiles as a second or later phase of its history. Thus it does not provide information about the

distinctive form of excubitoria nor, indeed, does it tell us whether there was a distinctive form at all.

The literature on this building is repetitive, and BR (pp.58-60) gives all the imprtant conclusions regarding the building itself. The following are all the main reports and discussions: Pelligrini (1867), chiefly on the archaeological discoveries; P.E.Visconti (1867), Henzen (1867) and Henzen (1874), on the graffiti; Capannari (1886), on sebaciaria (see 4.31); Nocella (1887), on the graffiti; and Castagnoli (1949-1950), recording some earlier brief notices.

The best available texts of the graffiti at the moment are those in CIL.VI, 2998-3091, together with the following three which are not in CIL but which are given by Capannari (1886,268f.) without precise provenances:

(no.4) COH VII VIGIL ANTONIANAE | 7 ARRIANI T N ROGATVS | SEBACIARIA FECIT ex k FEB | IN PRIDVE . KAL MARTIAS | IMP ANTONINO AVG . IIII . | ET ALEXANDRO CESARE COS

(no.5) ....RVM ET | ...I VII VIG GORDI | ... POLLENTINVS | ... HIARIAM FECIT | ...M SALVIS COMMA | niPVLIS SVIS BONO SVO

(no.6) FILIX | SEBACIARIA FECIT MSE | RE OMINA TVTA [sic]

The plaster bearing the graffiti has now all gone from the walls; but there do exist photographs of some of the graffiti, in the collection made by Parker for the exhibition of the British and American Archaeological Society held in Rome in 1870 (catalogue: Parker 1870). The negatives of these photographs have been destroyed, but a few sets of the prints survive. In the set in the British School at Rome, nos. 639 and 640 show graffiti scratched in the plaster while it was still wet, nos. 642, 643, 653, 655, 657 and 658 show many of the other graffiti.

These are a most valuable record, and it is hoped that they will be of use in the compilation of the new corpus of graffiti (Solin 1971). For this thesis, I have not attempted to disentangle the graffiti in the photographs, and the graffiti are discussed in the places relevant to their content, using the readings in CIL.

It is one of the graffiti, VI.3010, dedicated to the genius of the excubitorium, which identifies the building as an excubitorium.

The building consists of a courtyard surrounded by rooms, with a fountain in the centre (Fig.31). It is built in brick-faced construction, datable by brick stamps to the reign of Hadrian. In the south wall of the courtyard is an aedicula, now very damaged, but dated by Lanciani from the style of the mouldings to the time of Severus and Caracalla (Lanciani 1897,549). There now remain only slight traces of the frescoes in the aedicula; it is clear that firefighting scenes are not represented, but identification of the figures is very difficult. The courtyard was paved with mosaic marine scenes, but these have now gone completely, together with most of the herring-bone tile foundation of the floor. BR Plate III shows the fountain and the aedicula; a portion of the mosaic can be seen in the illustration given by Lanciani (1888, facing p.20). Rather more can be seen, together with a good impression of the walls and windows, in an aquarello painting, kindly shown to me by Professor Cozza. It is not clear at what stage the Vigiles took over the building. The evidence for their occupation, the 107 graffiti, belongs to the period A.D.215-245 (A.D.215: VI.3002; A.D.245: VI.3028), though we cannot rule out the possibility that some of the undatable graffiti belong outside this period. What does seem probable is that the building was extensively redecorated

around 215, with the aedicula being built or rebuilt and the walls newly plastered. But this need not have coincided with the takeover by the Vigiles.

There is a bath nearby, but the incompleteness of the excavations makes it uncertain whether it even forms part of the same building. The tunnel which connects the two structures is modern, but is built with ancient bricks. The northern part of the excavated section of the excubitorium incorporates some medieval walls, the building having probably remained in use. Today, part of the shell survives to second or third floor level.

The archaeological objects found in the excubitorium include statues, lamps, pieces of frieze, part of a hinge, a small clay altar, and the inscription VI.579, none of these and the other small objects having any apparent connection with the Vigiles, and raising the suspicion that they did not use the building into the later phases of its imperial history. Just one object is of interest in connection with the Vigiles, and that is more for the questions which it raises than from any new facts which it provides. Near the door was found a bronze torch (Fig. 32), 1.3m in length, in three sections fitting into each other. One end is pointed, as if for sticking in, the other consists of a globe in the form of a flame, and with a hole in the ovoid side of the globe. The globe is hollow, and could have held fuel; the hole would have been at the highest point when the torch was at an angle of about 45°. Simply as a lamp, this torch is very elaborate, and it is interesting that it would have worked at that angle. Could it have been placed by or over the door, near which it was found, an equivalent, perhaps, to the red lamp of modern times? Had it any

connection with the duty of sebaciaria (cf.4.31.5)? There is no obvious way to follow up these questions; but this torch deserves to be remembered.

The information obtainable from this, the sole excubitorium which has been certainly identified and examined to any extent, is very disappointing. However, the information from the graffiti, and the fact that such a building was suitable for an excubitorium, are important.

6.3.1

The existing (final) plan of the castra at Ostia is shown in Figure 33. The excavation reports are generally clear in themselves and do not need detailed repetition here (Lanciani 1888 and 1889, Vaglieri 1912). Although discussion of the nature of the type of castra vigilum must be based on the Ostian castra, some of the basic - and wrong - assumptions of the original reports have not been challenged, and the type of building has consequently remained in a certain amount of confusion and obscurity. In order to build a good foundation for the general discussion, we have first to establish the character and development of the Ostian castra. Then it will be possible to show that in its main features it resembled the castra in Rome for which we do not have adequate information (6.6.5), and to generalise from it.

6.3.2

We must first clear away the misconceptions in the excavators' reports. Basically, certain conclusions were reached before the evidence was properly available. The building was identified at the outset of the excavations by the discovery of the marble base

dedicated to Diadumenianus (XIV. 4393). At this early stage, only the western part of the building had been seen, and Lanciani had observed two periods of work (Lanciani 1888, p.741). The tabernae at the western end had been closed in and made accessible only from the east, and general appearances suggested that "l'edificio, in origine appartenente a privati, fosse espropriato o tolto in affitto dalla prefettura urbana, per alloggiarvi il disaccamento dei vigili, di servizio in Ostia ed in Porto". Hence arose the notion of original private ownership. After a little more excavation, but still before it had reached as far east as either of the main side entrances, Lanciani wrote as follows (Lanciani 1889, p.19):

> "Il carattere della tre fronti e caratteristico, e dichiara assai bene la natura e la destinazione dell' edificio. Si tratta certamente di una domus signorile, con botteghe, ed ingressi sulle quattro strade, tolta in affitto o comperata dal fisco, e trasformata in caserma. La trasformazione ha avuto effetto mediante la chiusura di tutti i vani di porte o botteghe, conmuro a cortina traforato da feritoie. I muri di chiusura hanno impronte figuline dei tempi di Severo e Caracalla: mentre il resto della fabbrica sembra appartenere ai tempi di Hadriano."

The observations of the alterations are valid, as are the datings; but by this stage the notion of the original "privati" had become fixed in Lanciani's mind, and it affected his interpretation of the components of the building. The Augusteum was interpreted as originally "la sala principale, tablino, tribunale, o che altro si fosse" (Lanciani 1889, p.77), though it is hard to find any valid analogy in private houses. The cental courtyard, when only partly excavated, was interpreted as an atrium (Lanciani 1889, plan on p.78). This was as far as Lanciani

carried the excavation. When Vaglieri took over and completed it, he also took over too much of Lanciani's unjustified interpretation and lent it permanence. These excavation reports need to be read with critical attention.

6.3.3

The building consists of a large courtyard, originally paved with stone, surrounded on three sides by a portico and single rows of rooms, with the cermonial focus (the Augusteum) on the fourth side. Large rooms with large windows flank the Augusteum, and behind these rooms is another row of rooms. Behind these is a narrow courtyard, then the most westerly row of rooms. Three large entrances open into the courtyard, which is almost bi-axial in plan. There are two latrines in the building, three water tanks, and six staircases. The overall size of the building is approximately 69m east-west and 40m north-south, and the total area is about 2,760m^2. Several phases may be observed in the construction of the building, and since these were not set out clearly in the published reports it is essential to show them now.

6.3.4

The greater part of the building is of brick-faced concrete (opus caementicium). Brickstamps, of which the earliest belongs to A.D.123, give an approximate indication of the start of the construction, and the dedication of A.D.137 (XIV.4357) a terminus ante quem for its completion. There are no bonding courses, normally "the only marked characteristic by which the monuments of opus caementicium of the time of Hadrian may be distinguished from those of the periods immediately preceding and following it" (van Deman 1912, 421). This lack of bonding courses may possibly be ascribed to the influence of the

architect Apollodorus in an official building of this sort, even outside Rome itself (ibid.). For dating the various parts of the structure, it is possible to use the criteria indicated by Miss van Deman (1912), utilising the size, colour and type of bricks, and the thickness and colour of the mortar joints, together with the composition of the concrete where visible. These criteria are, in part, based on the walls of this castra vigilum which are datable from brick stamps.

6.3.5

There are also structural changes in the building which help to establish the history of the building. These changes are as follows:

(1) The row of rooms at the west end (shown hatched in Fig. 35) started life as a row of shops. It was not in the original plan, since not only do all the east-west walls join onto the north-south wall with straight joints, but also the room in the south-west corner of the original building has ventilators intended for the open air but now opening into one of the shops. The narrow courtyard did form part of the original plan, and had two pedestrian entrances in the west wall; the southerly was blocked, probably when the shops were added, and remained blocked with a tank later placed across it, the northerly was presumably blocked when the shops were added, but was found unblocked (the unblocking probably having taken place when the shops were incorporated into the fire station). The brickwork of the shops is Hadrianic, that of the street door blocking walls is Severan.

(2) In the outer walls, where they survive high enough to show it, there are narrow splayed openings, which have often been referred to as

"loopholes", "feritoie"; they are in fact ventilators, such as are commonly found in storerooms (Rickman 1971,81). These ventilators represent a change of plan during the original construction, since below some of them are straight vertical joints in the brickwork where ordinary rectangular windows have been bricked in. Construction did not proceed evenly everywhere, and the south end of the west wall in the original building (i.e. minus the shops) received ventilators straight away. Lanciani assumed that this change from windows to ventilators (which he took to be loopholes) was to be associated with the presumed conversion of the building from another use (private house) to fire station. But this does not follow, and there is no need to explain the change of design by a change of use; both the original design and the alteration are consistent with the building being a fire station right from the start. Moreover, the ground plan does not exhibit any corresponding alteration.

(3) Some doorways were broken through walls. This is a feature which has not been properly utilised, but is clearly demonstrable because the broken brickwork can be seen in these doorways, whereas original doorways have clean faces. Access to the row of rooms behind the Augusteum can thus be shown to have been altered.

(4) Walls have been added, demonstrable both from the straight joints, and also, in some instances, from the presence of plaster along the joint. The style of brickwork can help to date these additions. The embellishment of the Augusteum is datable to Severus by the brickwork and the style of the mosaic. (I am most grateful to F.B.Sear for dating the mosaic.)

(5) The room at the original north-west corner underwent several changes, all of them clear from a superficial inspection. Originally a shop within the overall limits of the fire station (like the room just to the east), its street entrance was blocked and a door broken through from the fire station; then a latrine was inserted. When the shop on the (final) corner was incorporated, the latrine probably went out of use, and a doorway was broken through to give access to the new room. At some stage a dedication to Diadumenianus was placed in this room (XIV. 4393), having probably been removed from the courtyard (BR p.109).

(6) The north and the south entrances were both narrowed, and then blocked. The blocking was done in the time of Severus, as indicated by the brickstamps and the style of the brickwork. The blocking of the south gate was removed by the excavators.

(7) The two water tanks with their troughs at the east end of the courtyard are additions to the original plan. The nature of the brickwork assigns them to the fourth century. It is possible, therefore, that they had nothing to do with the building while it served as a fire station, though we do not have any evidence to settle this point. But what is certain is that, however suitable these tanks might seem to have been for a fire station, they are late, and at most it might be argued that they could have replaced earlier tanks. But late in the life of Ostia it became common to insert such tanks, and the connection with the Vigiles must remain dubious. (The other tank, in the narrow courtyard, is datable from its brickwork to the time of Severus, and thus was used by the Vigiles.)

(8) There are various changes in the north-east corner, including the reversal of the lower portion of the staircase. The sequence of these changes is not clear, and some of them are probably later than the Vigiles' occupation of the building.

6.3.6

These changes are complicated and probably reflect many phases in the history of the building. However, arguing from the basic evidence, it is possible to suggest four main phases (while allowing for minor alterations at other times than the main changes):

(1) Hadrianic fire station, with shops at the north-west corner; during the actual construction changes were made to the windows. This building occupied slightly less than the total area of the block, and shops along the west end were added very soon after the fire station was built, still in the time of Hadrian.

(2) Incorporation of the shops at the original north-west corner, followed by insertion of a latrine.

(3) Under Severus, the row of shops along the west end was incorporated into the fire station, the Augusteum was enlarged and embellished, the water tank in the narrow courtyard was built, and the north and south entrances were blocked.

(4) The final group of changes, which need not all have been contemporary with each other, are all late, and possibly unconnected with the use of the building as a fire station. They include the construction of the two tanks at the east end of the courtyard, and the construction of the blocking walls in the north-east corner of the portico.

The four plans(Figs. 34,35,36,33) show these main periods.

6.3.7

This suggested development of the building differs from previous accounts in that it attempts to elucidate the main phases, and also accepts that the original structure was a fire station. There is hardly any archaeological indication when it ceased to be a fire station; there is just the general probability that the fourth-century alterations would not have been needed if it were still a fire station and functioning as before. On these grounds, it probably ceased to be a fire station, in the original sense, by around the middle of the fourth century (see also Appendix II).

6.3.8

The archaeological evidence for the enlargement under Severus finds good confirmation in the inscriptions (XIV.4381 and 4387) which record the rebuilding in A.D.206. Simple repairs would have been explicable by the passing of seventy or eighty years since the station was built. The enlargement must be related to the evidence that in A.D.205 the corps of Vigiles was doubled in size (see 5.2.1). After 205 the vexillation consisted of four centuries, two of them based in this castra, the other two being at Portus, with around 300 men in each (see 4.29). Before 205, the number at Ostia must have been around 150. This doubling in the demand for accomodation explains why the shops were taken over.

6.3.9

The Augusteum was enlarged and made more splendid by Severus, but it always provided a focal point. It held the imperial dedications, which overflowed into the courtyard. The only one missing from the series is that to Hadrian, which probably occupied a central position but was replaced by one to Severus when he rebuilt the station. The mosaic portrays

sacrificial scenes appropriate to the location.

6.3.10

There is little evidence for the specific functions of the other rooms. The majority - and certainly those on the upper floors - must have housed the men. Some rooms must have been offices. The rooms on the ground floor, being fitted with ventilators, would appear most likely to have been storerooms and equipment rooms. The fact that the stairs were not fitted with ramps, as were those in store buildings (Rickman 1971,82), indicates that their main traffic was people. BR (109f.) raises the question whether a fire engine was kept in the room immediately north of the Augusteum, and seems to decide against the idea. Certainly he is right to note that the grooves in the threshold are cut, not worn, and in this respect they are typical of many Ostian thresholds with grooves (i.e. drains); but the question is really based on a false notion of what a Roman fire engine (i.e. pump) was like. The pumps could have been kept anywhere, since they were portable.

6.3.11

One question which cannot be answered at the moment is how the building which we can see is related to earlier buildings on the same site. Although there is a fairly high degree of symmetry in the castra, it should be observed that the rooms do in fact vary in size, those along the north side being somewhat deeper than those along the south side. Also, the two latrines appear to be using separate drains, that for the north-western latrine (the one which was inserted) being

approximately 1 metre less deep than the one for the south-eastern. Given plenty of resources and plenty of expertise, this building would repay excavation, provided that the scale of operations was big enough. At the moment, therefore, we must be cautious of drawing conclusions about this building. Although we have to generalise from it in discussing the nature of castra vigilum (see 6.6.5-6.7) it is important to bear in mind that many of the details cannot be known at the present time and to confine the discussion to the points which have been established. Fortunately, these are the major ones.

6.4.1

A brief description of the castra at Portus is given by Lanciani (1868,188). The building is identified by the discovery of five inscriptions which refer to the Vigiles (XIV.6,13,14,15 and 231). The last of these, XIV.231, is of some interest because it is dated to A.D.386 and is dedicated to two centurions of the Second and Seventh Cohorts respectively; its contribution to our understanding of the late history of the Vigiles is considered in Appendix II. XIV.15, described by Dessau as "Vix recte descripta", has as its third line

EA CASTRA VI

which may notwithstanding be expanded to ?] CASTRA VI [gilum . In the first line, the cognomen of L.Valerius [--- should not be restored as [Frontinus], since he is described as a centurion of the Fifth Cohort, whereas the L.Valerius Frontinus on XIV.6 and 13 is a centurion of the Second Cohort.

6.4.2

After giving the texts of these inscriptions, Lanciani writes as follows:

"QUASI TUTTE LE INSCRIZIONI TESTE mentovate si estrassero dalle ruine di un considerevole edificio diviso in celle e spettante all' epoca degli Antonini. In esso pertanto non dubiterei riconoscere la stazione dei vigili, molto più che vi si rinvenne altresi una grandissima tavola lusoria, solito passatempo dei soldati, e di cui fu trovato un esemplare anche nella stazione militare ostiense, anche essa divisa in celle all' uso dei castri. La stazione dei vigili in Porto, se è vera la mia congettura, troverebbesi sulla sponda destra della fossa Triana, fra la cittadella (ora Episcopio) e le mura della città."

This building is shown on the plan (Tav.LXVIIII) in Mon.Inst.8, 1868, from which Figure 37 has been extracted. Lanciani's description appears to imply something rather more than is shown on the plan, and it is possible that he saw more than the plan records. His dating of the building makes it later than the Ostian castra by a few years.

6.5.1

With the castra at Ostia and at Portus, the evidence for the date of the original construction is good and clear (Hadrianic and Antonine respectively: 6.3.4; 6.4.2). In Rome itself, we have seen that the excubitorium in Region XIV as a structure is Hadrianic though the evidence for the Vigiles' occupation belongs to the third century (6.2.7). Only two of the castra provide any indication of the dates of their construction. The Fifth Cohort built two aediculae in 111 and 113 of which the dedications survive (VI.222 - actually of 156 but recording the original construction in 111 - and VI.221, of 113). These aediculae are dedicated to the genii of two centuries, and such constructions are consistent with fitting out a new castra. The Fourth Cohort also built an aedicula, to the genius of a century,

this time dedicated in 130 (VI.219; BR. plate I). In view of the fact that at Ostia the vexillation had by this time received special accomodation, it is likely that this dedication followed the construction of the castra by a few years. Certainly these three dedications give a terminus ante quem for the construction of the castra, though probably not long before. The probability is that the construction of the castra in Rome should be ascribed to Trajan, even though the work may have been completed under Hadrian.

6.5.2

Before the reign of Trajan, the Vigiles were probably in lodgings, just as the Praetorians had been at first (they were provided with their own barracks by Tiberius: Suet. Tib. 37). Dio (55.26), referring to his own time, says that the Vigiles had "τείχη ἐν τῇ πόλει", meaning the castra, no doubt.

6.6.1

We have now reviewed the archaeological evidence for the castra vigilum. During the last half-century there has been nothing to add by way of archaeological discoveries, though it has been possible to improve the basic presentation and interpretation of the material, taking account of related studies. In the discussion upon which we embark now the most important innovation, which virtually affects our understanding of the nature of castra vigilum, concerns sixteenth-century antiquarianism. In a sense, there is again no new evidence. But certain recent antiquarian researches have provided a stimulus to re-examine the sixteenth-century material, and the result is virtually a new set of basic material.

In considering the castra of the Fifth Cohort (6.2.5), brief mention was made of the alleged description of the castra, written by Ligorio, the sixteenth-century antiquarian, and it was suggested that this description should really be referred to Nero's Macellum Magnum (Rainbird and Sear, 1972). No more needed to be said about it in the context of the location of, and the archaeological remains of, the castra of the Fifth Cohort. Briefly, in our paper we said that Ligorio wrote a description of what he thought to be the castra vigilum though he was mistaken and confused the castra with the Macellum Magnum. In examining this confusion, the experiment was tried of seeing how far a rational explanation was adequate for what is otherwise to be attributed to Ligorian mendacity and imagination. This section which follows now shows the result of that experiment; the conclusion is that the experiment was fruitful, and that we can add significantly to our knowledge of castra vigilum. Moreover the result is favourable to Ligorio, and to his aims and methods; and this coincides with other recent studies of Ligorio, which will be noted in due course.

There are two versions of the description. The Italian original is in Cod. Taur. V f. 127-128, and a later Latin version is in Cod. Vat. Lat. 9141 f.143. De Rossi (1858,pp.268 n.2 and 291-194), and Hülsen (1907,412), have established that the authors were respectively Ligorio and Holstein. For convenience, both texts are given below, the Latin one differing slightly from the Italian.

"Castro Celimontana de' soldati Vigili fu in Roma nel monte Celio di là degli acquedotti dell'acqua Claudia, fra l'hospitale del Salvatore in Laterano et il monasterio di S. Steffano, ai confini delli castri peregrini, nel cui luogo hoggidì vi sono le vigne di M. Lippo et di Uberto Strozzi gentiluomini Mantovani, i quali per piantare esse vigne hanno spianto le rovine di esso Castro,

alloggiamento dei soldati che la città di notte guardavano, dove havemo veduti alcuni vestiggi della pianta de'fondamenti ch'erano sotto delle rovine scassandosi il luogo. Et si sono veduti i luoghi che haveva di quattro torrioni quadrati, uno per angolo del Castro et per quattro lati fra esse torri erano quattro stanze larghe XX piedi e longhe XLVI et a destra cinque stanze di XV piedi larghe et longhe XX et a sinistra altre cinque stanze simili et così per tutti quattro i lati erano l'altre a destra et a sinistra della altre grandi simili di quarantasei piedi, et le torri fiancheggiavano essi lati delle sale et camere. Nel mezzo dell'area era un tempietto d'ordine Corinthio con i capitelli di marmo bianco: come ancora le spire o vogliamo dire Basi et i piani di terra, et l'epistilio et le corone del marmo lunense in forma di fuori di rotondo periptero,di colonne porfiritiche et di dentro era ottagono con due porte, una al meridie et l'altra al settentrione, et in ogni angolo era una colonna di porfido et in ogni lato le sue cella o nicchi; quattro quadrati e quattro di mezzo circolo et nelli nicchi quadri erano le dette entrature, et il vano di dentro fu di piedi e fianchi o mura di cinque piedi, et le colonne di dentro di esso ottagono grosse oncie XIII, et quelle del periptero di fuori oncie XV. Il periptero largo piedi VIII, secondo mostravano le miserande rovine, tra le quali fu trovato questo fragmento delle inscrittioni, che vi erano di doi Tempi, sotto del principato del Gran Traiano Augusto et di Hadriano, dove si fa menzione dell'Aedicula, et di alcuni Uffitiali de'Vigili et del Genio a cui fu dedicato il tempietto inchiuso nella sua piazza con le dette stanze, e torrioni. I muri dei tramezzi dei alberghi erano grossi doi piedi e quello della torre piedi quattro con scale di dentro da montare nelle parti di sopra. Et così fu l'albergo della cinque cohorti o Compagnie nel Celimontano Castro, perchè nell'Esquilie ne fu un altra pure a dì nostri stato desolato et spianato.

"Castrum Caelimontanum vigilum fuit Romae in Coelio monte ultra aquaeductum aquae Claudiae, inter hospitale Salvatoris in Laterano, et monasterium S. Stephani contiguum fere castris peregrinorum, quo loco hoc tempore est vinea Lippi et Uberti Strozziorum, nobilium Mantuanorum, qui vineam consituri complanarunt rudera

hujus castri vigilum Romanorum. In iis observavi vestigia quaedam fundamentorum et cubiculorum, et perspexi stationem illam habuisse quatuor turres sive castella in extremis angulis. Et quatuor latere inter turres illas singula quatuor habebant conclavia, lata pedes XX, longa pedes XLVI, et a parte dexera quinque erant cubicula lata pedes XV, longa XX, et alia quinque similia a parte sinistra atque ita a quatuor lateribus erant alia cubicula a dextris et sinistris quadraginta sex pedum. Turres respondebant lateribus cubiculorum et camerarum; in media area erat aedicula operis Corinthii cum epistyliis marmorius candidi, cum spiris, coronis, aliisque ornamentis ex marmore Lunensi; cingebatur periptero rotundo columnarum purpuriticarum, interius autem erat octangula, et duas habebat portas, alteram obversam septentrioni, alteram meridiei. Singuli anguli suam habebant columnam porfyreticam, et singula latera suas cellulas (nicchii vulgo), quatuor quadrata forma, et alia quatuor semicirculari. Et in cellulis quadratis arant portae; spacium internum erat XXX pedum, latera sive muri pedum V, et columnae interiores hujus octagoni erant uniciarum XIII. Exterioris autem peripteri columnae erant uniciarum XV, latitudo peripteri pedum VIII, quantum ex miserandis illis ruinis cognosci potuit, in quibus haec reperta fuit inscriptio, quae ad Traiani et Hadriani tempora pertinet, et aediculae hujus, ejusque genii meminit et aliquot officia vigilum commemorat; parietes inter cubicula crassi erant pedes II, muri autem turrium pedes IV, et in turribus scalae erant, quae ducebant ad cubicula superiora. Haec statio habebat quinque cohortes vigilum. Similis statio nostra tempestate detecta et deiecta fuit in Exquiliis. Inscriptio extat apud Manucium et Gruterum.

I must here record my great debt to Frank Sear, who studied these descriptions and from them produced the plan which I give as Figure 38 (also published in our paper as Figure 1). The basic point which we make is that the plan is clearly of a macellum (meat and fish market), and that, from its close resemblance to the illustrations on Nero's coins of the Macellum Augusti, this macellum is to be identified as

Nero's macellum, while from its location, on the Caelian Hill, this is in turn to be identified as the Macellum Magnum. There are also some points of detail which are uncertain; for example, the towers at the corners might have protruded, and we might also have to reckon with the possibility of alterations and additions; for example, the internal columns of the tholos might be additions. But these questions are best left for a full architectural study of the plan. It is Ligorio's confusion which interests us now.

In our paper, we refer only briefly to a possible explanation for the confusion. We say (p.45):

"To confuse a market with a statio vigilum would not have been difficult, and, knowing that there was a statio vigilum on the Caelian, Ligorio probably did no more than misreport the findspot of CIL. VI, 222, and produce a false identification."

That is really the conclusion of the discussion which follows now.

6.6.2

Let us first review the facts at our disposal. The castra of the Fifth Cohort was situated near, and probably under, the church of S. Maria in Domnica (Figure 29). Manutius describes VI.222, as discovered "In monte Caelio, ad D. Stephani, prope Navicellam", but we do not know whether this refers precisely to the Villa Mattei, or more generally to that area; but, even if it was found outside the castra, it cannot have been found far from it. Certainly it is an implausible description for the area to the east of S. Stephano Rotondo. Ligorio himself knew of the existence of this inscription from Manutius, but he does not write as if he had been present at its

discovery. Next, the description of the remains of the grounds in the later Villa Fonesca may be interpreted as that of Nero's Macellum Magnum. This much is plausible. What is less plausible, though it cannot be proved for certain that it is untrue, is Ligorio's statement that VI.222 was found in the tholos of his building. Probably it was not until the discovery of VI.221 in 1735, in the grounds of the Villa Mattei near the church of S. Maria in Domnica, that it became possible to locate the castra of the Fifth Cohort precisely where we know it to have been. Next, we know that Ligorio believed that the castra peregrina, lying both according to him and also in fact west of the Macellum Magnum, consisted of two squarish courtyards, surrounded by rows of rooms (see Figure 39, a copy of Ligorio's plan). There is a tholos (i.e. S. Stephano Rotondo) in the centre of the eastern courtyard with something distantly resembling a military headquarters building in the centre of the western one. This latter would have lain below the church of S. Maria, and since that church was not repaired in the sixteenth century it would appear impossible for Ligorio to have known what lay underneath it. Moreover, the later archaeological discoveries near the church raise difficulties over how such a headquarters building would have fitted in: did it look out onto walls? It is best to take this much of that plan as imaginative reconstruction. For our present purpose, what matters is that Ligorio was thinking in terms of large courtyard buildings in that general area, and the resemblance to the "macellum" plan is obvious.

6.6.3

There is no reason to doubt that Ligorio's description of the remains in the later Villa Fonseca is substantially accurate. The

interesting question now is why he decided that they were the remains of a castra vigilum. The crucial piece of evidence is the final sentence of the Italian text, and the penultimate sentence in the Latin:

" Et così fu l'albergo delle cinque cohorti o Compagnie nel Celimontano Castra, perchè nell' Esquilie ne fu un altra pure a dì nostri stato desolato et spianato."

"And such was the lodging of the five cohorts or Companies in the Celian Camp, because another of them, in our own time, on the Esquiline had been uncovered and levelled."

"Similis statio nostra tempestate detecta et deiecta fuit in Exquiliis."

"A similar station in our own time had been discovered and levelled on the Esquiline."

The implication of this is that it was the resemblance between the remains on the Esquiline and those on the Celio which was crucial for the identification. It thus turns on the identification of the remains on the Esquiline.

Once more we can use evidence of genuine authenticity. We have already seen (6.2.2) that the base set up by the Second Cohort (VI.1059) was discovered in 1550 and that Ligorio knew of its existence. He had thus already become acquainted with a properly-identified castra vigilum, though no description of it has come down from him. Evidently, what he saw on the Celio resembled this castra sufficiently closely for him to note a resemblance, and probably VI.222, which records repairs to an aedicula, was found sufficiently close to the

site for him to have assumed that it came (originally, anyway) from the tholos which he saw. Certainly parts of his description of the tholos are verbally similar to the wording of VI.222, and this would be a natural use of one piece of evidence to complement another, the archaeological remains being "miserande rovine".

We are thus led to the interesting conclusion that Ligorio was confused because a castra vigilum (on the Esquiline) and a macellum (on the Celio) resembled each other fairly closely. This is the confusion which is extremely useful to us when we consider the nature of castra vigilum (below, 6.6.5). But before we leave Ligorio and the sixteenth century, we should note briefly how our implied assessment of his work fits in with other studies.

6.6.4

'Ligoriana' has, indeed, become a term of abuse, and Ligorio has fared particularly badly at the hands of Mommsen in the field of epigraphy (especially CIL.VI, p.LIII col.1). It is, therefore, worth emphasing that in using his description of the remains on the Celio we have tried to work out what he actually saw, regardless of how he interpreted his information. In fact, he appears from this study as a thoughtful and, probably, an accurate observer. There is no reason to suppose that he has deliberately sought to mislead posterity over these particular remains. This assessment of his work finds confirmation from another study of Ligorio's antiquarian interests, this time in the field of art history.

Good illustrations of Ligorio's methods are given by Mandowsky and Mitchell (1963), editing his drawings in the Neapolitan manuscript XIII.B.7. On the first page of the manuscript Ligorio explains his

system of diacritical signs, intended to describe the actual state of the inscriptions. With sculpture also Ligorio indicated in many cases what remained of the statue, so that it is possible to see how much he has restored in the drawing; and examples are cited of striking confirmation of the accuracy of the record of the drawings. On Ligorio's provenances, Mandowsky and Mitchell conclude (p.44):

> "On the evidence of our manuscript, then we can say this. In no instance can a location of Ligorio's be proved definitely false. In some cases his word is clearly corroborated by other witnesses; and in many cases his statements are so circumstantial that they deserve credit. In short, even where Ligorio is the sole authority for the provenance or even existence of a monument, his word - prima facie - deserves credit."

This conclusion takes account of the mistakes which Ligorio made in reconstructing some of the statues, and implies that (even in Ligorio) a mistake in reconstruction need not imply a mistake in basic observation. He is certainly found not to have been gratuitously lying.

In the case of the building on the Celio, we have seen that there is reason to doubt the findspot of VI.222, but there is every reason to accept Ligorio's description of the building. Although it is true that it will take much more work to rehabilitate Ligorio, these two studies do suggest that Ligorio deserves sympathetic study. What emerges is that Ligorio resembled the other antiquarians of his day in wishing to recreate classical antiquity in all its fullness, even if this entailed the supplementing of inadequate information or material with material drawn from elsewhere or actually invented to

illustrate some point. It is sometimes true that the modern historian cannot distinguish between the fact and the fiction of antiquarians of that period, but the distinction between fact and fiction was clear to them, and obscurity in their expression does not imply obscurity of intention. It is salutary to approach these antiquarians with sympathy, and, in the case of Ligorio, to note how many of his hundreds of inscriptions were in fact correct, and how many of his other pieces of information were also correct. With the building on the Celio, we have an instance of good archaeological observation.

6.6.5

We may now return from our Ligorian digression, having advanced the argument an important stage. From Ligorio's confusion between the (genuine) castra vigilum on the Esquiline and the building which he saw on the Celio (identifiable as the Macellum Magnum) of which he has left a description, we can say that the castra vigilum on the Esquiline was a large courtyard building, easily confused with a macellum. In comparison with this generalisation, the information available from excavations of castra vigilum in Rome is extremely scrappy.

Using this generalisation, we can further observe that the castra at Ostia, a large courtyard building which again could be confused without too much difficulty with a macellum, must also have resembled the castra in Rome itself. There may well have been some differences of scale: a vexillation of 150 or 300 men should not have needed as much space as a cohort of 500 or 1,000 men; and it may be that there were other differences, for example, in accomodation for offices. But any differences should not obscure the broad similarity.

The similarity between the buildings of Ostia and those of Rome itself has often been observed, and this much might also have been expected of these castra. Our study of Ligorio's confusion provides a specific ground for asserting this similarity. This is a new departure.

6.7.1

The first analysis of the relationship of the castra vigilum at Ostia to other types of building was that of Calza (1941). He grouped it with the Casa di Diana (fig.40), the Casa delle Muse (fig.41), the Casa del Serapide (fig.42), the Casa degli Aurighi (fig.43) and the Horrea Epagathiana (fig.44); all of these Ostian buildings consisted of tabernae and apartments arranged around courtyards. Calza may be criticised for relying too much on plans in grouping the buildings, and paying too little attention to function. And he might have reached different conclusions if he had noted that the castra vigilum is larger and has a much greater greater proportion of courtyard than the others in the group. Some of the Ostian horrea are better parallels in this respect, e.g. the Piccolo Mercato (fig.45).

Boethius (1960) retained Calza's grouping (making it his type IV), but put it in the context of the utilitarian architecture of large courtyard buildings (p.134):

> "In connection with the unbroken legacy from the later Roman Empire to medieval life, we should also mention the predilection for peristyles and porticoes, and we should remember that peristyles were not always parts of palaces. It is more important, no doubt, for their development in medieval times that they were at least as typically part of utilitarian architecture: of

> warehouses, of barracks like the Caserma dei Vigili in Ostia, of market places like the Piccolo Mercato, the Horrea di Hortensius in Ostia, and Eumachia's building in the Forum at Pompei, and of Hellenistic hotels like the caravansary of Kassope in Epeiros with its court measuring 14.2 by 11.7 meters, flanked by porticoes [JHS lxxiii, 1953,120]."

The basic theme is very simple, and capable of application to a wide range of functions. Varied needs were answered in a similar way, and tenements which happened to include such a "utilitarian" function shared the luxury of an inner court with peristyles (p.159).

The most recent study, that of Packer (1971), criticises Calza's classification for being too simple (p.5), and instead classifies buildings by "the use made of their ground floors" (p.6). This is broadly in line with Boethius' approach, and Packer approves of Boethius' application of the notion of "megastructures" to the combinations of rooms, often covering an entire block or more. It is unfortunate that Packer does not depart in any essential from the opinions of Lanciani and Vaglieri regarding the castra vigilum itself, despite his detailed examination of the building and observation of points of detail (pp.23,24,25,33,40).

He seems basically to regard the castra vigilum as a large apartment block, and at the one point where he seems about to examine the function of the building simply says: "As the barracks of the city police [sic], the Caserma dei Vigili forms a rather special case" (p.17). He does not say precisely what constitutes the special case and spell out which this implied for the architecture. At the very least, he might have suggested what the courtyard was intended for: as "police", would the Vigiles have

needed one? Packer estimates that the number of occupants was over 100 (p.71, n.34), an estimate based on the plan alone. He could have referred to BR, who gives the figure 600; the number suggested above (at 4.29.8) is two centuries, i.e. 150 raised to 300. 300 men would have occupied the building in its enlarged state. Packer's figure is thus a considerable under-estimate. The Caserma dei Vigili was not a typical apartment block. Even if the architecture were not distinctive, the number of occupants must have been.

One very good point made by Packer is that the building just to the east of the castra vigilum is very similar (p.18; my fig.46). In fact, this building resembles the Ostian castra vigilum more closely than does any other building yet uncovered. This makes the lack of records of its excavation particularly tragic; it can only be hoped that it has not been completely excavated. Its existence serves to remind us that the castra vigilum is not unique in all respects.

When we review the available models, we can see that the designer of the Ostian fire station, and probably also of the ones in Rome, had such a wide range as to provide virtual freedom and very little need to develop a radically new design. The time of Trajan is suggested as the most probable period for the provision of castra vigilum, and the plans of the buildings which follow show the sort of models available around that time (the plans show buildings or phases of buildings existing at that time).

6.7.2

The courtyard is an essential feature, used for drills and parades. The Augusteum at the end provides the ceremonial focus.

In functional terms we have the equivalent of the palaestra. The basic palaestra theme is shown simply in the hellenistic gymnasium of Miletus (fig.47). (The distinction between 'palaestra' and 'gymnasium' is not for discussion here: there was confusion in the ancient world as well as the modern.) Later development of the gymnasium as a cultural centre, with lecture rooms, led to the addition of exedrae, such as are incorporated in the Baths of Titus in Rome, and reach their most elaborate form in the gymnasia of Asia Minor, for example, in the Harbour Baths of Ephesus, where they merit the title 'Marmorsaal'. Such buildings were used by the paramilitary youth organisations.

The plan of macella is similar, though much of the space in the courtyard is taken up with the tholos (or tholoi at Lepcis). The macellum at Pozzuoli has a shrine at one end (fig.48), and the incorporation of the shrine into the portico is found in Rome also, in Vespasian's Temple of Peace. The macellum at Pompei, though less regular in its plan, also has a cella, at the end, which housed two statues. It is clear why Ligorio could confuse a macellum and a castra vigilum, particularly since the church of Santo Stefano Rotondo lay in the centre of one of his presumed courts of the castra peregrina and could remind him of a macellum tholos.

Military buildings also provide points of similarity. There is a degree of resemblance between the courtyard with peristyle, hall and five rooms of the typical auxiliary principia (e.g. Housesteads, fig.49), and the courtyard with peristyle, row of three large rooms, and row of five smaller rooms of the castra vigilum. The praetorium of the Third Legion at Lambaesis (fig.50) shows the same theme, though on a larger scale. The similarities are not, however, close

enough to demonstrate that the castra vigilum is simply an adoption or adaptation of a normal principia.

The House of the Vestals (fig.51) shows an interesting combination of dwelling and ceremonial rooms, courtyard and garden, the result of intermittent changes.

Among more formal buildings, the Ludus Magnus (fig.52) shows how the functions of dwelling and of amphitheatre were united: rooms arranged around the perimeter of a rectangle with a small amphitheatre occupying the place of a courtyard. This is the only identified example (other than castra vigilum) of anything like a purpose-built residential gymnasium. It shows how flexible an approach was possible. The House of the Gladiators at Pompei (fig.53) seems to have been adapted to this use, but the building itself does not show any special alterations made necessary by the provision of dwelling accommodation in a gymnasium.

6.7.3

The significant point is that the designer of castra vigilum had the benefit of various models which in important respects were not so dissimilar. It is not surprising that resemblances can be seen. An army officer could have found the ground plan of the castra vigilum reminiscent of a principia, but this is not to argue for a military model. The value of the discussions by Calza, Boethius and Packer is that they relate the castra vigilum to civilian buildings of the larger, "utilitarian" type. The courtyard was an essential feature of a fire station, hence the result.It was not inevitable that a residential gymnasium should be planned in this way, but it was very natural. Given the courtyard and the size of the building, the derivation from a domus becomes a red herring.

6.7.4

The real test of this discussion of castra vigilum will be whether future discoveries fit the pattern of "residential gymnasia": buildings with storerooms on the ground floor and dwellingrooms above, and with a prominent courtyard focussing on an Augusteum or cella.

6.7.5

For the moment, we have progressed quite some way beyond BR, who does not discuss castra vigilum as a type of building. When sufficient survives of a building, it appears possible to decide whether it is a castra vigilum or not, even in the absence of epigraphic evidence; though the mere plan (such as is used in the Severan Marble Plan) might need confirmation from elsewhere. In relation to the question, how far the Vigiles were military and how far they were civilian, the answer to be derived from the fire stations is that they were paramilitary.

CHAPTER 7

THE CITY OF ROME

7.1.1

One of the most interesting things about a fire brigade is the way in which it both reflects and responds to its environment. We have looked at the Vigiles in terms of their personnel and matériel, and it is necessary now to look at their environment, the City of Rome and its offshoots, Ostia and Portus. By looking at the context of their operations, we are able to see why they were able to function as they did, and to see how far a particular mode of operations was forced on them by circumstances beyond their control.

7.1.2

To a large extent, this chapter is informed by a comparative study of firefighting, in the sense that the questions which are raised are the sort of questions which arise in any study or analysis of firefighting. On the other hand, actual comparisons are kept to a minimum, because it is felt that in this study the evidence should stand on its own feet in the interests of clarity. Also, once the material can be presented in this way, then it will be easier to produce valid comparisons.

7.1.3

We start by examining the evidence for fires and fire risks, and then go on to look at the resources and potentials which the City offered for firefighting. It will emerge that the Vigiles were a peculiar reflection

of peculiar circumstances, and that the distinctive features of their operations arose from factors which were beyond their control and not directly connected with firefighting.

7.2.1

It would be ideal if we could examine our literary, epigraphic and archaeological data and draw up tables showing the number of fires of different sorts, the causes of the fires, and the circumstances which made them spread. Unfortunately, this type of investigation is difficult enough even with present-day fires, chiefly because fire is prone to destroy the evidence. Moreover, although in a general sense practically every fire which occurs could have been anticipated even if not actually prevented, it remains an absorbing problem why ordinary fittings, furnishings and equipment become, on occasion, very bad risks; and we therefore run into the difficult problem of analysing the fires which did not occur. Compared with the number of sources of heat, there appear to be comparatively few fires (though the actual number of fires is, of course, very large); what is really interesting is the way in which particular circumstances become dangerous.

7.2.2

Our best evidence for the nature of the fires in Rome is literary, and among the historians Dio is the most useful to us. Within the period which he covers, practically every fire which was important is recorded by Dio, and in some cases his reporting is like that of an eye-witness: he thus preserves some of the important details. But there is the difficulty with fires in Rome that it is not always possible to be sure

that two or more accounts refer to the same fire when it is suspected that they might; and for this reason it is all too easy to put down several separate fires as a single conflagration. Except in the case of single monuments, where signs of burning can be tied to particular known phases, there is little to be gained from archaeological evidence, and certainly burnt layers are not known over sufficiently wide areas to enable us to deduce anything of the nature of particular fires (see Appendix IV). Inscriptions can be useful for telling us the date of burning of a building and of its repair, and sometimes it may be deduced that a particular burning formed part of a wider conflagration which is attested in the literary sources.

7.2.3

There have been several studies of fires in Rome, mainly devoted to determining the extent of each fire and the buildings affected. For the period of the Vigiles, that of Werner (1906) is of first importance, and it incorporates the results of the earlier main studies; though with the publication of the dictionary by Platner and Ashby (1929), it is now easier to refer to Canter (1932), who incorporates Werner's work in his own paper. The fire of A.D. 64, of course, has a literature of its own, of which just one single paper stands out (Hülsen, 1909).

7.3.1

The evidence for fires is better for the Empire than for the Republic, though in each case it takes the same pattern. For the Republic, 15 fires are recorded, of which 7 were widespread conflagrations. These fires were concentrated along the Tiber and in the region of the forum. For the Empire, 44 fires, all important, are recorded with good authority. The distribution of fires under the Empire is as follows (the total number appears to be more than 44 because the occurrence of a fire in each region is counted separately even though a single conflagration could affect more than one region):

Region	Number of fires recorded
I	0
II	0
III	2
IV	4
V	1
VI	2
VII	1
VIII	14
IX	9
X	8
XI	3
XII	2
XIII	2
XIV	0

Werner (p.47) observed that the majority of fires are recorded with reference to public buildings, and left it an open question how many other buildings were involved. Dio (66.24.3), listing the public buildings

affected by the fire in A.D.80, hoped that from the list of buildings which he gives the reader may estimate how many others were affected, and in the absence of any numerical or alphabetic system for addresses the most common way to indicate the extent of a fire was to name the public buildings involved. In addition, repairs to burned public buildings were likely to remain in the records, and in some cases an inscription on the building itself would give the information. There is only one figure for the number of buildings destroyed in any fire, that which is given for the fire under Antoninus Pius (S.H.A. Pii 9.1): "et Romae incendium, quod trecentas quadraginta insulas vel domos absumpsit". Otherwise, we have just the figures for the numbers of Regions destroyed or partly affected by the fire of A.D.64 (Tac. Ann 15.40):

3 Regions completely destroyed
7 Regions largely destroyed
4 Regions intact

7.3.2

Canter gives the following analysis of public buildings which we know to have been affected more than once, covering both the Republic and the Empire (p.279):

Temple of Vesta	5	times
Regia	4	"
Theatre of Pompey	4	"
Temple of Jupiter Capitolinus	3	"
Basilica Iulia	3	"
Basilica Aemilia	3	"
Theatre of Marcellus	2	"
Pantheon	2	"
Colosseum	2	" [sic: ? 3]

To these could be added the Circus Maximus, which was a major risk because of the timber used in the upper parts of its construction and because of the buildings round about it. It was burned in 31 B.C. and A.D. 36, and the fire of 64 started in tabernae on the Palatine side (Tac.Ann.15.38); it was burned again in the reign of Domitian. Trajan repaired it in stone, and no more fires are recorded in it; but it did subsequently collapse twice, in the reigns of Pius and Diocletian, and we are entitled to wonder whether the zeal for fire protection led to structural weakness.

7.3.3

A comparatively high proportion of attested fires are recorded as actually starting in a public building. In contrast with only 10 alleged cases of arson in the total of 59 attested fires (a proportion which modern estimates would find rather small if the statistics were valid), the following list, taken from Canter (p.280), shows 30 instances of public buildings struck by lightning:

Temple of Jupiter Capitolinus	3 times
Colosseum	3 "
Temple of Quirinus	2 "
Temple of Salus	2 "
Temple of Ceres	2 "
Pantheon	1 time
Domus Augusti	1 "
Atrium Publicum	1 "
Many temples (e.g. of Juno Lucina, Spes, Ops Penates Dei Pietas Pax Luna Jupiter Victor)	1 "

The reason is clearly the height of the buildings and the timber construction of the roofs, and, in the case of the Colosseum, the use of timber fittings and of awnings at the highest level. Very often these buildings will have attracted lightning to themselves, the temples in particular often being designed to stand out above the other buildings (cf. Vitruvius 1.7.1).

7.3.4

Although Dio records important details which concern firefighting, he does not tell us as much about the actual fires. On this topic, he is best on causes, though we have to be as careful with Dio as we do with modern alleged causes of fires. In addition to recording lightning strikes and alleged cases of arson (often in common with other writers), he tells us of the only fire recorded as having started in a private dwelling (73.24.1: A.D. 192) and that, interestingly, at night (the time when, but for the Vigiles, most fires would have got out of hand). He also records what might appear to be a fantastic account of a fire in 12 B.C. (55.29.8), in which the Hut of Romulus was said to have been set ablaze by crows which dropped upon it burning meat from an altar. Although it is generally true that wild animals and birds will try to avoid fire, we should not dismiss the story out of hand. Werner (p.13) refers it to Dio's own superstition and comments: "Sed haec leviora". But it is not difficult to think of a situation which is in itself plausible and which could produce the sort of account retailed by Dio. For example, it would be enough to account for the story if a spark or small piece of burning material from the sacrificial fire were carried up by convection currents or by the ordinary wind, and deposited on the roof of the Hut; and some onlooker, seeing crows flying in the vicinity, attributed the transmission of the burning material to them. It is notorious how people describe fires in terms of what they think ought to have happened rather

than what they actually saw: thus a common modern confusion occurs after aeroplane crashes, in which no fire breaks out until the plane touches the ground but eyewitnesses claim to have seen a ball of fire in the sky. A similar imaginative reconstruction of the cause of a fire is given by Herodian in his account of the fire in A.D. 192 (1.14.2-6), for which, as we have seen, Dio records that it started in a private dwelling. Herodian says that the cause was an earthquake, and, although this is not an impossible cause, it does seem probable that the ignorance and superstition attached to bad fires fixed on an earthquake because this was suitably portentous.

7.3.5

One fire which is worth looking at individually for its own interest is the one which was blamed on Nero, in A.D.64. The question whether Nero was responsible for causing the fire has remained a point of controversy among modern scholars. The most monumental study, that of Profumo (1905), finds Nero entirely guilty. Profumo's documentation is impressive, but his conclusion is implausible. As Hülsen (1909,46) comments:

> "The idea of deliberately planning such an enormous conflagration, and of calculating the direction in which the fire must spread, appears too fantastic even for Nero; to start the fire in the immediate neighborhood of the imperial palace with the intention of destroying quarters nearly half a mile distant is still more fantastic. Any little unsuspected incident might upset the plan, and divert the fire from the course intended; and in fact, what really took place did not correspond at all to the design as conceived by Profumo and represented on his plan (Tav.2)."

Despite a reply to this from Profumo (1909), Hülsen's remains the better case.

There is, moreover, a hint in Tacitus' account of the fire (which is more full than any others) that we have to read between the lines in

order to appreciate what was really happening. It was merely infamia and rumor that Nero had to counter (Tac. Ann. 15.44); there is little by way of firm evidence against him in the sources. Possibly the strongest suspicions are given in this passage (Ann. 15.38):

> "Nec quisquam defendere audebat, crebris multorum minis restringere prohibentium, et quia alii palam faces iaciebant atque esse sibi auctorem vociferabantur, sive ut raptus licentius exercerent seu iussu."

There are analogous accounts of later fires (though none, unfortunately, from the Roman period) which show how the layman tends to reconstruct fires according to what he thinks ought to have happened rather than what he actually saw. Both Tacitus (Ann. 15.38) and Dio (62.17.2) refer to a wind which developed and caused the fire to spread, and this wind must have been caused by the fire in the effect known as a "fire-storm": the development of convection currents which carry burning materials around or above the level of the roofs so that the fire becomes self-propagating on a very large scale. One result would be that people would see new fires starting, apparently spontaneously, a little way off from the existing fires. Dio is quite certain of Nero's guilt, saying that he sent men out to start fires in different places (62.16.2), and that the Vigiles, as well as the other troops, took part in this, for the purpose of plunder (62.17.1):

> "οἵ γὰρ στρατιῶται, οἵ τε ἄλλοι καὶ οἱ νυκτοφύλακες, πρὸς τὰς ἁρπάγας ὁρμῶντες οὐχ ὅσον οὐ κατεσβέννυσάν τινα ἀλλὰ καὶ προσεξέκαιον."

Tacitus also refers to the use of torches, in the passage quoted above. Once it is recognised that there was a fire-storm, the references to plunder are explained, as far as the spread of the fire is concerned, and we are left with the interesting way in which the rumours developed.

Now Suetonius (Nero 38) refers to demolitions, in a passage to which we have already referred in connection with ballistae (4.12.2):

"et quaedam horrea circa domum Auream, quorum spatium maxime desiderabat, ut bellicis machinis labefacta atque inflammata sint, quod saxeo muro constructa erant."

The Vigiles, co-operating with the other troops, must have been responsible for these demolitions. The general sense of this passage is that the Vigiles were operating in a competent and firemanlike way, having decided that their only recourse was to create a fire break in the quickest way possible. Clearly, they had decided which buildings and areas should be abandoned. In practical terms, this means that they had put these areas and buildings out of bounds, and that as far as they were able they had to stop people going back in. This surely is what Tacitus refers to when he writes of the threats and the prevention of attempts to extinguish the fire; and Suetonius also records the prohibition on entry (Nero 38). The 'auctor' in this case will have been the praefectus vigilum or the emperor. As for the 'faces', there are several possible explanations for these. They might have been emergency lighting, or burning materials which were being removed. Possibly they were used in counter-burning, to reinforce the ballistae. Or possibly they were simply figments of the layman's imagination.

There is one other feature of the fire which provoked criticism, and this is the alleged recital by Nero on the Tower of Maecenas (Suetonius Nero 38) or the roof of the palace (Dio 62.18.1). It is entirely plausible that Nero did ascend to a high look-out point, and it is also probable that the praefectus vigilum went with him; the latter may well have spent a good part of the six days and seven nights which the

fire lasted on the tops of high buildings. It is clear that Nero did all that he could by way of remedies and precautions for the future (see 7.6.4), and his reason for ascending was probably entirely laudable and practical. Looking at the accounts of the fire through modern eyes, there is one further point which may be inferred. It was evidently felt that there had not been enough water: for this reason, Nero ordered that there should be guards to protect the water supply (Tac.Ann. 15.43):

"iam aqua privatorum licentia intercepta quo largior et pluribus locis in publicum flueret, custodes."

Clearly something had gone wrong with the firefighting to let the fire get out of hand, but once it had become large and developed into a fire-storm no amount of water could have stopped it. It is possible that in the early stages, when the fire had just been discovered and might have been put out, there had been a lack of water, both in the premises and also in the nearby public supply, and that vital minutes had been lost. For this, it is likely that the praefectus vigilum was blamed, unjustly. It is possible, therefore, there was some attempt at distraction by imputing blame to the staff of the curatores aquarum and that they responded by alleging theft of the water (as they may have reacted later on when Frontinus' survey of the aqueducts showed that the (inaccurately) calculated amount of water was greater than the amount actually delivered: cf. Ashby 1935,28,32). If there was a certain play of departmental politics, then it is possible that the praefectus vigilum was made responsible for part of least of the guarding of the aqueducts, probably during the night; though if it is true that private individuals were responsible for thefts of water, they may have been the landowners outside Rome (Ashby p.32), and guards will have been needed outside the City.

Returning to the question of Nero's guilt, we should note that there was widespread panic, and every incentive to find a scapegoat. Even today, a similar process takes place after big fires, blame being imputed both to the firemen and also to the government. Firemen may be blamed for starting or for encouraging the fire when all that they have failed to do is to prevent any damage, and their professional training and their detachment make them "outsiders" in a panic situation. In addition, hostile interests may well seek to distract justified criticism by blaming the fire authorities. With the fire of 64, we have also to reckon with the character of Nero himself, which may well have helped to create the rumours. We may contrast this fire with the bad one in A.D.80, in the reign of Titus: he a "good" emperor, was not blamed. Certainly Nero's measures were good and although it may be thought unfortunate that he resorted to the burning of Christians afterwards there is a good enough reason to explain why he was driven to this desperate step: he was, after all, being blamed for the worst fire in Rome's history. Even the fact that he was blamed is some evidence for the devastation of the fire; and finds a good parallel with the Great Fire of London in 1666 which rumour ascribed to the evil intents, among others, of King Charles II.

It is, then possible to interpret the sources for the fire of 64 in a way which is not hostile to the Vigiles but which shows them acting properly and to the best of their capability. As Hülsen saw, we have to stand back a little to see the sources in their proper perspective. The details which we possess can be interpreted consistently and plausibly, and to the credit of the Vigiles. To those who object that the fire should never have got out of hand, the answer is that compared with medieval cities Rome had a very good fire record, and that this one failure should be set

against all the fires which did not get out of hand. According to the estimate of the number of fires in Rome (see below, 7.5.4), this was one fire in eleven million.

7.3.6

The picture which we can draw from the accounts of particular fires is rather biassed. The majority of fires must have been in private dwellings and have not been recorded for posterity. Juvenal gives the more general picture, with fire being a constant threat and with many of the inhabitants being unable to escape from their upstairs rooms (Sat. 3. 6-9, 190-202):

"nam quid tam miserum, tam solum vidimus, ut non
deterius credas horrere incendia, lapsus
tectorum adsiduos ac mille pericula saevae
urbis et Augusto recitantes mense poetas?"

"quis timet aut timuit gelida Praeneste ruinam
aut positis nemorosa interiuga Volsiniis aut
simplicibus Gabiis aut proni Tiburis arce?
nos urbem colimus tenui tibicine fultam
magna parte sui: nam sic labentibus obstat
vilicus, et veteris rimae cum texit hiatum,
securos pendente iubet dormire ruina.
vivendum est illic ubi nulla incendia, nulli
nocte metus. iam poscit aquam, iam frivola transfert
Ucalegon, tabulata tibi iam tertia fumant:
tu nescis; nam si gradibus trepidatur ab imis,
ultimus ardebit quem tegula sola tuetur
a pluvia, molles ubi reddunt ova columbae."

We possess a certain amount of evidence concerning both fires and building history which helps to fill in this more general picture; then it will be interesting to speculate how many fires there were per day.

7.3.7

There was a tremendous number of naked flames in ancient Rome; Spano (1920) has shown that lamps were placed in considerable numbers in practically any position in order to obtain adequate light. There were also many braziers and chafing-bowls, in the virtual absence of built-in ovens. It was difficult to make fire. Morgan (1890) reviews the evidence for the methods used for producing sparks: wood on wood, stone on stone, and iron on stone (this latter possibly the least common of these three: Morgan p. 38), as well as the rays of the sun. All the first three methods, which were the ones in common use, take time: Blackstone (1957,25) records that in the nineteenth century, although one might be fortunate and make fire in two minutes, half an hour was not uncommon; and by that time the equipment had been made more convenient. There was thus a strong incentive to keep fire burning all the time, probably in the form of charcoal, and secondly, when the fire did go out, to carry burning material from a neighbour. Morgan also notes (p.19 n.1) the sale of fire, "ignis emendus", in Juvenal (Sat. 1,134)

Then too fire was carried by those attending banquets (Juv. Sat 3. 249-253):

"Nonne vides quanto celebretur sportula fumo?
centum convivae, sequitur sua quemque culina.
Corbulo vix ferret tot vasa ingentia, tot res
inpositas capiti, quas recto vertice portat
servulus infelix et cursu ventilat ignem."

All of these practices put dwelling places at risk. The practice of carrying fire is particularly dangerous, and was commonly forbidden in medieval cities.

7.3.8

In general the dwellings lacked chimneys, and all heat had to go out through the doors and windows. The result of such an arrangement is well known, that the heat ascends, collects under the eaves, and can eventually lead to firing of the roof. Hence Vitruvius expressed the wish

that larchwood could be got to Rome more easily (2.9.16):

> "Cuius materies [larchwood] si esset facultas adportationibus ad urbem, maximae haberentur utilitates, et si non in omne, certe tabulae in subgrundiis circum insulas, si essent ex ea conlocatae, ab traiectionibus incendiorum aedificia periculo liberarentur, quod ea neque flammam nec carbonem possunt recipere nec facere per se."

Such an arrangement could work for only a limited period before the larchwood decomposed. But it can only have been used rarely, if at all, because of the expense. Vitruvius also unwittingly indicated how easily heat could spread, when discussing the problem of dirty plaster (7.3.4):

> "Semper enim album opus propter superbiam candoris non modo ex propriis sed etiam alienis aedificiis concipit fumum."

Where smoke travelled, heat and sparks could also travel.

7.3.9

The risks which would today be classified as industrial were spread fairly evenly throughout the City. Generally the workshops occupied the ground floors of the insulae, providing frequent sources of heat below the living quarters. Many of the specialist concentrations, for example those which constituted the vicus cornicularius, vicus lorarius, vicus sandalarius and vicus materiarius (Moretti 1958), would have been similar to each other in point of fire risk, and need not be distinguished here. Bakeries, which were a special risk because of the ovens and the dust, are given the following distribution in the Notitia Urbis:

Region	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Bakeries	20	15	16	15	15	16	16	20	20	20	16	25	20	23

Allowing for possible corruption in these figures, there does not seem to be any evidence that bakers worked in concentrations; this risk would therefore have been evenly spread through the City. It does not follow, however, that

industrial risks were given special attention, at least in law. But in the absence of special provisions from the law codes, where special regulations would surely be found if they existed, we can assume that the Vigiles will have given special attention to the workshops, exercising their right to beat those who kept their fires negligently (Dig. 1.15. 3-4). It will, of course, have been greatly to their advantage that these risks were at street level. They were also helped by the small size of most of these establishments. This remained a constant factor throughout the existence of the Vigiles.

Even such advantages as the Vigiles could find in the nature of the industries were not due at all to awareness of fire risks. Loane (1938,155f.) finds the explanations for their characteristics in social and economic factors:

> "A consideration of the Marble Plan and of the few remains of tenement houses at Rome has also failed to show essential changes in industrial and commercial quarters. Although the need of expensive equipment and of specially trained artisans fostered manufacturies of some size for baking, fulling, and the production of silver plate and luxury furniture, only in the case of brickmaking did large numbers of workmen appear. Yet even here the unit of five or six men was basal. The conditions that resulted in lack of manufacturing on a large scale in the city included not only the absence of metals or fuels nearby, or labor-saving machinery, and of patents to protect trade secrets, but also the Roman law on partnerships, which hindered the concentration of capital and industry, and especially the lack of respect that prevailed in ancient society for the success won from commerce and trade."

Such attitudes brought benefits for fire protection, so long as the Vigiles could catch the fires early. This they clearly aimed to do.

7.3.10

There were two other categories of fire which must have been fairly common though we do not hear so much about them. These were in ships and on derelict properties. A very bad ship fire occured in A.D. 62, when one hundred corn ships were destroyed in an accidental fire ('fortuitus ignis': Tac. Ann 15.18); but the large number of ships, and particularly those carrying cargoes of grain and timber, must have provided fairly frequent calls upon the Vigiles (for numbers of ships, see Rickman 1971,11). The cohorts along the Tiber (i.e. I,IV, and VII) will have become more specialised in ship fires than the others. Ship fires must also have been a feature of the duties of Ostia and Portus, though there is no evidence that Cohorts I,IV and VII provided a major proportion of the vexillations (see 4.297).

7.3.11

About fires in derelict properties there is little to say, other than that such properties seem to attract the attention of tramps, squatters and amateur arsonists, and that the continual collapses and fires in Rome will have ensured a steady renewal of dereliction. The fire in A.D. 64 left areas derelict for some years (see, for example, Suet, Vesp. 8.5: "Deformis urbs veteribus incendiis ac ruinis erat; vacuas areas occupare et aedificare si possessores cessarent cuicumque permisit"; and VI. 826). How much such areas added to the work of the Vigiles it is impossible to say.

7.3.12

There was one futher type of risk, which was non-structural but was none the less important. This was the lighting used at festivals and games. Caligula seems to have been the first to light the whole of the City at night (Suet. Caligula 18.2), if Suetonius does not exaggerate,

and the use of lighting on a large scale for celebrations continued long afterwards. That this was a serious fire risk is shown in the edict for the Secular Games of A.D. 204, which has a special provision for firefighting and fire watching (VI.32327, lines 21 and 22):

"admonemus Quirit[es d]ominos urbano[s et eos quoq]ue qui mercede habitant in noctibu[s feriarum illarum ut una cum mili] | tibus nostris circumeuntibus[reg]ionum tutelam diligenter admistrent [sic CIL]

There is thus not a little irony in the need for the emperor, through his fire brigade, to lessen the fire risk brought about by the imperial way of life. There is also an interesting irony in the celebrations on the 1st of March. This was the traditional New Year's Day, and some of the ceremonies connected with this continued into the imperial period. One of them was the rekindling of domestic fires from the freshly-kindled sacred fire of Vesta on that date (this ceremony being different from the Vestalia, held on the 9th of June, which in the imperial period was largely a food and bakery festival). 1 March was also the start of the official year used by the Vigiles, following military precedent (see 5.2.8), and it must often have been a good induction for the recent recruits, newly milites facti, to put out the fires caused by the mass carrying of fire around the City. The evidence for this ceremony is Solinus 1.35:

"Romani initio annum decem mensibus computabant, a Martio auspicentes adeo ut eius die prima de aris Vestalibus ignes accenderent"

He uses the past tense, so perhaps the ceremony became obsolete, even though the rekindling of the fire of Vesta continued and also the fires in houses were re-lit (Ovid Fasti 3.143-144). But even this latter will have increased the risk as neighbours borrowed fire from each other to take the tedium and effort out of the ritual.

7.4.1

The one characteristic shared by practically all fires is that they start small and only become big if the circumstances are right. In Rome, the circumstances were right. The principal factors were the overcrowding and the type of building construction. The fact of overcrowding is well-established and there is little to say in detail; it may be noted that overcrowding in a tenement block "enormously increases the risk" (Manual 4, p. 61), and the more people there are in a block the harder it is to get them out before the fire reaches them. The evidence for building construction is quite informative. The main points of interest from the firefighting point of view are the materials and the way in which they were used, and the chief materials to be examined are timber, brick and stone.

7.4.2

Our assessment of the contribution of the use of timber to fire risks in Rome must depend at least as much on our estimate of the amount of jerry-building as on assumptions about the innate properties of timber. The Manual (4, p.4) describes timber as follows:

> "Wood will normally burn readily, and its use can make a building vulnerable to fire. It is obvious, for example, that when a domestic building with boarded floors, wooden joists and wooden roof catches fire, and is not extinguished, the floors and roof generally burn out, while the brick walls remain standing. On the other hand, thick baulks of timber have quite good fire-resisting properties, and heavy timber beams, though severely charred, are often found in place after a fire which would have rapidly caused the collapse of unprotected steelwork.
>
> In general, the fire resistance of timber depends on two factors - its thickness and the design and workmanship in its construction. Wood is a poor conductor of heat, and this characteristic, combined with its tendency to form a protective skin of charcoal on surfaces exposed to a fire, results in the outside wood protecting

the inner from the heat of the flames. This protective skin of charcoal, moreover, tends to smoulder slowly, rather than to burn, thus further reducing the rate of combustion. The use of thick wooden floors for certain types of building has been common in America for many years, and is known as "slow burning mill construction".

Though the various types of wood, such as oak, fir, mahogany, ash, elm, etc., burn at slightly different rates, this factor is of less importance than the tightness and rigidity of the joints and the quality of the workmanship. Tongued and grooved boarding will withstand fire considerably longer than butt-jointed boarding, because the heat and flames cannot pass through the cracks between adjacent boards."

On half-timbered houses, the Manual observes (4, p.61):

"The upper floor beams are often cantilevered out from the face of the building so that each floor projects over the one below. The weight of each floor is thus balanced see-saw by the weight of the wall. Contrary to expectation, these cantilevered walls are surprisingly stable in a fire and complete collapses are infrequent, but the brick nogging may come away. Although the heavy oak posts and beams are very fire resistant, and even the smaller oak floor beams and boarding are often more resistant than modern softwood flooring, the many concealed spaces, the labyrinthine passages and the considerable alterations and additions carried out through the centuries make them extremely vulnerable and fire usually spreads with great speed."

The fire resistance of a timber beam or post depends chiefly on its cross section: the bigger the better (Manual 4, pp.31 and 34).

7.4.3

There is no doubt of the small effect of fire on fired clay bricks (Manual 4, p.4):

"Apart from a certain amount of spalling (flaking off under the influence of heat), clay bricks, as might be expected, are little affected by fire"

Stone may be inferior to brick (ibid., p.5):

"Stone is, in general, a good heat insulator, but is inferior to brick when subjected to continuous heat, owing to its tendency to spall or split into pieces, especially when water is suddenly applied.

Stonework should always be watched for signs of cracking when it is necessary to work beneath or near it."

The strongest stone walls are those with the fewest and the thinnest joints (ibid.p.16), and in a fire the best stone wall will be the one which is in a general sense well-built. Indeed,

"Provided . . . that a stone wall is well built, its fire resistance may be considered as substantially the same as that of a similar thickness of solid brick." (Manual 4, p.17)

A solid brick wall faced with stone may behave like a solid brick or stone wall, but if only thin slabs are used for facing, and are inadequately fixed to the wall, they may well become detached (ibid. p.18). A brick facing may also become detached.

The main risk in the use of brick or stone is that of collapse, normally because undue stresses have been set up by the fire. The Manual (4, p.17) lists the following common causes of collapse:

1) burning away of floors and cross walls, leaving walls without side support
2) expansion of beams (especially of steel) pushing wall outwards
3) disintegration of the joints by the heat
4) collapse of support for wall, e.g. an arch, though a natural arch may form over a large span and prevent total collapse
5) heating and expansion of the inner face of the wall, bending it outwards
6) the levering action of collapsing joists when built into the wall.

All of these , except for (2), are likely to have occurred in Roman buildings. A collapse may be less extensive if the structure has reserves of strength beyond what it needs for stability under normal conditions.

7.4.4

The effect of fire on concrete is less predictable (Manual 4, p.6):

"The behaviour of concrete depends, of course, largely on the time for which heating has continued, but also on the composition of the aggregates. Some aggregates such as limestones behave well, while others, including flint gravels and stones containing quartz, suffer relatively more damage. On the other hand, clay products such as broken brick remain substantially unaffected, since they have already been subjected to intense heat in the course of their manufacture. Slag and clinker aggregates, having also been pre-heated, possess many of the good qualities of brick."

7.4.5

Plaster can have good fire-resisting properties, provided that it is made from good materials and is carefully applied; but it is structurally weak, and can easily crack and fall away (Manual 4, p.5) It is possible for heat to travel in the space between the walls and the laths which support the plaster, the space acting as a flue; from this point of view, it is better if the plaster is applied straight to the wall.

7.4.6

For the types of construction in use at the time when the Vigiles were established the books of Vitruvius are of special value. The main change in construction took place in the second part of the first century A.D. and the first part of the second century, producing the brick-faced concrete which is familiar in many of the surviving buildings. Prior to the use of this concrete, stone and timber were more important structurally, and there was still a need to use sun-dried bricks in the absence of any alternative. The use of sun-dried bricks was effectively

banned in Rome, since their structural weakness meant that walls would have had to be more thick than there was space for (Vitruvius 2.8.17 - 18: see below, 7.6.3). The books of Vitruvius also give us some insight into the way in which a good Roman architect approached the problem of fire. A good account of the historical position of Vitruvius, and of his attitudes to old and new materials, is given by Boethius (1939). Vitruvius describes the constructions in use around 25 B.C.

Cost was one over-riding consideration for the architect, since he could not build more expensively than his client wished, particularly if the really suitable materials had to be transported some considerable distance (1.2.8; 5,6,7; 6.8.9). For the same reason, economies might be made in the care devoted to different parts of a building (6.6.8):

> "Namque de tegulis aut tignis aut asseribus mutandis non est eadem cura quemadmodum de his [the foundations], quod ea, quamvis sunt vitiosa, faciliter mutantur."

This economy in the area of the roof ignores that fact that roofs need special care because they constitute one of the more serious fire risks, something which Vitruvius knew (2.9.16).

What Vitruvius says about fire shows a good knowledge of the properties of different materials. He understood the danger of wattle walls (2.8.20):

> "Craticii vero velim quidem ne inventi essent; quantum enim celeritate et loci laxamento prosunt, tanto maiori et communi sunt calamitati, quod ad incendia uti faces sunt parati."

He knew how different types of stone behaved in fires, some of them being dangerous because they disintegrated with the heat. (2.7.2-3). And, in connection with a siege engine (10.14.3), he advised against the use of pine

and alder because they were flammable and brittle.

Yet, as we have seen, he was willing to economise over roofs. Again, despite his criticism of wattle walls, he recommends a light construction for an extra partition to be used where a wall was damp (7.4.1):

> "Sin autem aliqui paries perpetuos habuerit umores, paululum ab eo recedatur et struatur alter tenuis distans ab eo quantum res patietur, et inter duos parietes canalis ducatur inferior . . . "

Not merely has he introduced a construction which was probably flammable, but he has also created a flue by which heat could travel, possibly over considerable distances, and probably undetected. The light partition need not itself catch fire for there to be a risk: the build up of heat could be at the ceiling, and the partition could smoulder for a long time before a fire was noticed (Manual 4, p.21). And thirdly, what he recommends for the protection of roofs again concentrates on materials. He suggested that larchwood boards be placed around the eaves (2.9.16, quoted above, at 7.3.8). He seems to have in mind the spread of fire from one building to another ("traiectionibus incendiorum"), and not to have been aware of the danger caused by the lack of chimneys. This danger arose from the formation of pyrophoric carbon, caused by the continous attacks from heat which rose from the windows and doors, and it resulted in areas of timber which were at all times ready to catch fire extremely easily and even, if the circumstances were right, to catch fire spontaneously. The larchwood might have been successful in directing this heat away from the eaves, but Vitruvius did not envisage this as its function.

These indications, slight though they are, suggest that Vitruvius was less aware of the way in which heat behaves. When he writes about siege engines he is careful to include precautions against fire, yet he does not show the same care when he writes about buildings. Probably there was not a great deal that could have been done except to use different materials, and at that time the two materials which produced the greatest improvement in fire protection for Roman buildings, concrete and fired brick, were still new and comparatively untried. Indeed, the only way which Vitruvius knew for testing fired brick was to use it on a roof, and if it withstood climatic changes then it could be safely used in a wall (2.9.18). It was possible technically to use the materials current in Vitruvius' time in such a way as to reduce the risk of fire, but the hope of improved materials and the need for economy combined to inhibit experiment. The special designs for buildings entirely of timber which behave well in fires, such as are found, for example, in North America, represent a special sophistication encouraged by the local conditions (notably the lack of alternative materials), and they would not have been consonant with the conditions in ancient Rome.

Paradoxically, however, some of Vitruvius' recommendations would incidentally have improved fire protection in buildings, since a building that is in general sense well-built will tend to behave well in a fire. This is because, whether the building itself or the contents are on fire, the heat will produce weaknesses of which the seriousness will depend on the method of construction and the ability of the building to withstand extra stresses. This may be seen in his instructions for making a floor for upstairs rooms, using layers of rubble, concrete, <u>opus signinum</u> and marble or mosaic (7.1.2-3). All this had to be laid on a timber base. He describes carefully how

to support this timber base so as to prevent cracking if it were to sag. For outdoor floors of this type, he recommends the use of a double layer of wood, with the planks of the upper layer running at right angles to those of the lower layer (7.1.5). In a fire, this type of floor would not transmit heat very quickly, and the heat could build up underneath. However, the amount of timber needed to support the weight of the floor would be sufficient to last for two or three hours in a fire, giving a good reserve of safety. Moreover, by using a double layer of timber the fire-resisting quality of the floor would be greatly improved, because it would take much longer to burn through. Of course, when the end did come, it would be sudden, and firemen would have to be wary of a sudden collapse. It is likely that the method of supporting the timber, so as to avoid cracking, would mean that when the floor collapsed it would have room to move within its seating, and would not lever the walls and thus make them collapse also (one of the common dangers when a floor collapses).

7.4.7

About half a century after the establishment of the Vigiles, the techniques for using concrete had improved, fired brick was becoming more reliable, and the use of brick-faced concrete was becoming normal. This concrete consisted of mortar and aggregate faced with brick (or stone in the early stages of its development). It was essentially monolithic: the facing helped during the actual construction of a building, but structurally Ward-Perkins emphasises its "relative unimportance" (1970247).

Practically the whole construction was pre-fired: bricks, tiles, and the pozzolana (volcanic sand) used in the mortar. It was thus incapable of being ingited. Moreover, being monolithic, it lacked gaps such as occur in

timber construction through which heat could be transmitted. And finally, being strong under tension, it had reserves of strength which tended to make it behave well if a fire should break out. The thickness of many Roman vaults ensured that a tremendous amount of spalling would have to take place before the vault became dangerous. In these ways, it approached close to being a fireman's ideal material.

7.4.8

The destruction of much of Rome in the fire of A.D.64 provided an opportunity for rebuilding in an improved manner. Yet it is worthy of note that although Nero made good arrangements and regulations for the rebuilding (see below, 7.6.4) he did not recommend the use of fired brick. Boethius (1932,87f) even suggests that the type of building which he did recommend, with stone at the corners and timber permitted only in specified areas, was at least a century old. It is probable that the brick works at this time could not have coped with the sudden demand for brick such as there could have been in 64; though this does not necessarily answer Boethius' question why the use of brick did not develop widely under Nero (1932,88). Judging from the number and proportion of brick stamps, Loane (1938,102) suggested that a peak in the production of brick was reached in the reign of Hadrian.

7.4.9

Not all buildings after 64 were built to a high standard, either according to Nero's recommendations or in brick-faced concrete. There are records of collapsing buildings throughout the subsequent period (Boethius 1960 gives evidence for this), and Packer (1971,77ff) makes out a good case

for the continued extensive use of timber and the continued construction of flimsy, insubstantial buildings in Rome itself. Herodian (7.12.5) in particular records the extensive use of timber as late as 237, and clearly this continued. This is in contrast with Ostia, which was probably more completely rebuilt than Rome in the new materials, after the levelling carried out under Domitian (Meiggs 1960,64f).

7.4.10

Among buildings other than insulae, temples continued to be roofed with timber, and fires in temples are recorded throughout the period; while the construction of horrea (storehouses and granaries) shows some care for fire protection (on these, see Rickman 1971).

The most important precaution was to keep them separate from other buildings, and, even if a good distance could not be maintained, at least to avoid sharing a common wall (Rickman, pp.78f). When the use of brick-faced concrete was just becoming established, it seems that the precaution was taken of using stone in some of the important walls (e.g. the Grandi Horrea at Ostia, built in the time of Claudius, had its two main side walls built of tufa blocks: Rickman pp. 47 and 80), though by the time of Trajan faced concrete was considered to be reliable. The need for small storage compartments meant that the storerooms were small and largely independent of each other, and the risk of fire spreading from one to another must have been slight. Roofs were probably of wood, but the lack of heat ascending from below and the covering of tiles will have ensured that there was little chance of them burning except in a fierce conflagration. From the fireman's point of view, the disadvantage of these horrea was the limited access from the outside, and the number of locked doors inside. The system for locking the

doors was efficient (Rickman, pp.32-34, 55f, figs.4,5,6 and 14), and it may well have been normal for the Vigiles to fetch the keyholder rather than try to break in. Generally, however, there would probably not have been much trouble from horrea, and most of the activities of the Vigiles in connection with them will probably have been to ensure that other buildings did not set them on fire. Outbreaks of spontaneous combustion within them will have been dealt with easily. Grain, being stored in sacks (Rickman pp.8,86) could have been removed without too much difficulty if the need arose.

7.4.11

The impression which this survey of the types of building construction suggests is one which would make a fireman pessimistic. Both the amount of flimsy building and the overcrowding meant that the number of outbreaks of fires was large, and that it continued to be large despite the change to brick-faced concrete; and the evidence for collapsing buildings is evidence for buildings which behaved badly in fires. Ostia was probably better than Rome in this respect. Such improvement as there was in the method of construction was probably outweighed by the increase in the population, and at no time was Rome even reasonably safe from fire. The only type of building which was fairly safe was horrea, and these were designed with security specially in mind. Insulae, however solid the surviving examples may seem, cannot have been reckoned by the Vigiles to have been safe, since they were so full of people.

7.5.1

The evidence thus points to a high frequency of fires in ancient Rome: not an unexpected conclusion. But what is needed is an estimate of the number of fires per day, since it is one thing to recognise that there was a problem, and another to see what it meant in firefighting terms. The preceding analysis of the fires and the fire risks enables us to make some estimates, and below are two estimates by firemen followed by my own.

1) Estimate based on knowledge of the ancient buildings, the large number of naked flames, and a guess at the extent of ancient 'fire awareness' (taken to be similar to modern 'fire awareness' in Rome):

   100 fires daily, concentration in evening and early night, slight concentration in autumn

   2 of these becoming very important

2) Estimate based on knowledge of medieval buildings similar to those of ancient Rome, the probable extent of Rome, and the large number of naked flames:

   20 large fires daily

   2 of these being very bad

3) Estimate based on probable extent of ancient Rome, comparison with fire rate of modern cities with population in range $\frac{1}{2}$ to 2 million, comparison with fire rate of modern cities with similar types of buildings:

   50 to 150 attendances daily, mainly at night

   up to 4 large fires at once

7.5.2

These three estimates take different factors into account, and to some extent they are expressed in different terms. 1) and 3) are fairly close to each other. 2) is not as different as it might appear at first sight, since it is expressed in terms derived from modern firefighting. Behind it lies a guess that up to 4 fires out of 5 are not bad enough for a modern brigade to be summoned, but that 20 fire calls of the modern type may represent 100 actual fires; and of modern fire calls, 10% may be reckoned to develop into serious fires. In other words, 2), like the other estimates, indicates around 100 fires daily. Putting these estimates together, the following may be suggested as the average daily fire rate in ancient Rome:

100 fires daily needing the attention of the Vigiles

20 of these becoming large

2 of these becoming very serious

In addition there will have been an unknown number of 'interventions' by the Vigiles.

7.5.3

This estimate is put forward as an average, and it is probably best to take it as an average for the whole of the existence of the Vigiles. Probably the rate was higher before the extensive use of concrete and brick, but against improvements in the risks we have to set the extension of the City and the increase in population. The system of aqueducts probably kept pace with the expansion, and the increase in the size of the fire brigade in A.D.205 cannot but have been beneficial.

7.5.4

It is hoped that this estimate will convey something of the problem which faced the Vigiles. Although it is based on the most general impressions, there is a remarkable consistency in the three estimates on which it is based. It means that over the three to four centuries of the Vigiles' existence, they will have tackled over 11,000,000 fires.

7.6.1

So far we have examined the fire risks as they actually were, and have left on one side the matter of fire regulations. This was deliberate, not because the regulations were ineffective, but because they were just one factor leading to the effect which we have examined directly. They were, none the less, very important, and were as effective as the praefectus vigilum and the other authorities made them.

We look first at building regulations (remainder of 7.6), then look in the next section at the laws concerned specifically with firefighting (esp. 7.7.5-7; 7.7.10)

7.6.2

The topic of building regulations is one which becomes more and more difficult the more one goes into it. Not merely are the records of the laws incomplete, but in addition it is often difficult to relate them to the archaeological evidence, and to see how far they were actually followed: the outline of building history in section 7.4 strongly

suggests that often they were disregarded. In the main they concern the stability of buildings and the rights of neighbours, but there are a small number which are specifically concerned with fire prevention, and in addition some of the others do show a concern for safety from fire in providing that buildings should have certain reserves of strength. Because of the difficulties, it is proposed to keep this discussion very brief, so that it might serve as a basis for further work.

7.6.3

The earliest building regulations are found in the Twelve Tables, and concern the tacking-on of structures (6.8: tignum iunctum): party walls (i.e. walls between properties: 7.1); the space to be allowed when placing a fence, wall,building, ditch, well, olive or fig, or other tree near to a boundary (7.2: see note on this, F.I.R.A.2 vol.I, p.48); and the width of roads (8 feet when straight, 16 feet on curves: 7.6). The next explicit reference to building laws seems to be in Vitruvius (1.1.10), where he refers to the regulations concerning eaves-drips, drains and lights (though without saying what these were), and he further (2.8.17) explains the regulations concerning the thickness of walls: although party walls were restricted to a thickness of 1½ feet, other walls were not, but lack of space provided an incentive to keep them down to 1½ feet also; sun-dried brick in a wall of that thickness could not support more than one storey, and so stone pillars, walls of fired brick, and walls of rubble (opus caementicium)were used to give a greater height, the floors being of wood (contignationibus). Outside the City of Rome, it was permitted to use sun-dried bricks, since space was not so restricted (2.8.18). Within the City, the lack of space led to a ban on sun-dried bricks:

"Quoniam ergo explicata ratio est, quid ita in urbe propter necessitatem angustiarum non patiuntur esse latericios parietes, cum extra urbe opus erit his uti, sine vitiis ad vetustatem, sic erit faciendum..."

Within a few years from the time that Vitruvius was writing (c. 25 B.C.), Augustus set a limit to the heights of buildings at 70 feet (Strabo 5.3.7), possibly the first regulation of this kind, though earlier Rutilius had spoken "De modo aedificiorum" and Augustus claimed this as a precedent (Suet. Aug. 89). Strabo also records that this restriction was intended to prevent collapses, and that it only applied to new buildings and buildings on the public streets. In setting down this regulation just after, but separate from, the institution of the Vigiles, Strabo implies that the praefectus vigilum did not have to enforce the building regulations, and, in confirmation of this, such a responsibility is not given to him in the passage where it surely would have been, Dig. 1.15.3. About three centuries earlier, the use of shingles had come almost to an end (Pliny N.H.16.15.36), and it is probable that this was brought about by regulation. Otherwise, that seems to be all the extant regulations down to the time of Augustus. They corrected the worst features, but still left large areas of risk.

7.6.4

The fire of A.D.64 provoked quite extensive regulations concerned specifically with fire. Tacitus (Ann.15.43) records that the new buildings had frontages of specified dimensions and alignment, with broad streets and more space; the height was limited, and porticoes were built along the facades. Nero offered to provide these latter at his own expense, and their function is said to have been to protect the fronts of the buildings:

"additisque porticibus, quae frontem insularum protegerent".

Nero also specified that certain parts of the buildings were to be of Gabian and Alban stone, since these stones behaved well in fires. Boethius (1932.87f.), as we have seen, considers that this type of construction was over a century old, and evidently it was well tried and reliable. Firefighting equipment was to be kept in the dwellings, and party walls (i.e. shared structural walls) were banned. Suetonius, dividing his account of the fire between the "good" and the "bad" sections of the biography, records the damage in the latter (Nero 38) and the regulations in the former (Nero 16). He gives fewer details, referring to the porticoes which Nero built at his own expense:

"Formam aedificiorum urbis novam excogitavit et ut ante insulas ac domos porticus essent, de quarum solariis incendia arcerentur; easque sumptu suo exstruxit."

Suetonius says that the porticoes were intended for firefighting, to give access, that is, to firemen, and they would be useful both for access up the outside of the burning building itself and also for access to a building across the street; they could provide a position from which to operate pumps and so gain in height; and they would be useful for carrying out rescues and for enabling the inhabitants to escape. Tacitus is equally plausible, when he writes as though the porticoes were to act as a screen across the fronts of the buildings. Depending on their construction, they could have served to protect the buildings from radiant heat from a fire across the road, and it may well be that the buildings which were to be given this protection were still largely built in timber, and probably the porticoes were added to buildings which were left intact by the fire or needing only slight repairs. In this case, they will have been of special benefit to those who were too poor to afford the new type of house. The value of porticoes

will have been similar to the value of balconies, as seen, for example, in Figure 1, which shows the use of balconies both for firefighting and for carrying out rescues, and for affording access to every part of a large building without the use of long ladders. At Ostia some of the insulae have small balconies, which are too narrow to have been functional in the normal way and which do not always correspond to the floor levels within the building (Ward-Perkins 1970,p.569,n.11). While recognising that such balconies form a decorative feature, for example in the Campanian villa at Sette Bassi (Ward-Perkins, p.333), it is also probable that they represent a more economical version, in brick, of Nero's porticoes. Subsequently, balconies were built (or, continued to be built) in timber, and themselves created a fire risk (Herodian 7.12.5, fire in A.D.237).

Somewhat similar in point of fire risk were maeniana. These are described as follows (Paul. ex Fest. p.134 Mull.):

"Maeniana appellata sunt a Maenio censore, qui primus in Foro ultra columnas tigna projecit, quo ampliarentur superiora spectacula."

Structurally, these closely resembled a portico. There was an old ban on maeniana, which was re-implemented in A.D.367-8 by Praetextatus, praefectus urbi (Amm. 27.9.9):

"Namque et Maeniana sustulit, fabricari Romae priscis quoque vetita legibus."

In A.D.423, however, the maeniana had returned, with regulations concerning their spacing: they were only to be permitted if 10 feet of clear space intervened between opposing maeniana, or 15 feet if they faced public horrea (C.Just. 8.10.11).

7.6.5

These regulations concerning spacing form part of a series of laws, all late, which are designed to protect public buildings, particularly horrea. Under the Twelve Tables, buildings were not to approach nearer to a boundary than 2 feet, so that in theory 4 feet should have intervened between buildings on different properties (7.2;F.I.R.A.^{2} vol.i.p.48). This rule was clearly ignored, and also the laws de tigno iuncto remained substantially unaltered (Dig. 47.3.1-2), and were more concerned with convenience and with rights than with structural safety. The proper separation of private buildings remained a matter for individual judgment, and the tendency was for great blocks to be built (insulae), with roads surrounding them. Public buildings received better treatment from the law, though it is not until the fourth century that such laws became more numerous (and repetitive). In A.D. 329, it was enacted that buildings within 100 feet of public horrea were to be removed, and the whole of the property of the builders was to be confiscated (C.Th.15.1.4); the reason given for this regulation is said to have been recent experience of fires in buildings up against the horrea. The penalty refers to future building, and does not seem retrospective; probably this was the first occasion on which a regulation to protect horrea in this way had been made. In A.D. 398 another law (C.Th.15.1.38) ordered the removal of all private buildings from around public horrea so that they should be surrounded with a clear space "ut a principio fuerant fabricata". By

this time, it had become accepted that public horrea were surrounded by fire-breaks, and the construction of new ones must sometimes have entailed the demolition of private buildings. Public buildings in general were protected by a law of A.D.383 (C.Th.15.1.22), which forbade the encroachment of private buildings upon any forum or public place, and in 406 a further law enacted that (at Constantinople) 15 feet were to intervene between private and public buildings (C.Th.15.1.46). This regulation is reflected in the restriction on maeniana quoted above. Temples were included in the public buildings protected by these laws, but, even before 383, private buildings had been cleared away from temples, by Praetextatus in 367-8 (Amm.27.9.10):

"et discrevit ab aedibus sacris privatorum parietes, eisdem inverecunde conexos".

There was also a ban on private building in the Campus Martius, which was increasingly ignored under the Empire (Platner and Ashby, 1929, s.v.,p.93). In the case of temples, piety was also a major factor, in addition to the risk from fire. The late date of the regulations which concern horrea raises the question whether the abolition of the Vigiles at an unknown date in the fourth century (Appendix II) helped to create a serious fire problem, which hit at the food supply. (For other late building regulations which concern spacing, not necessarily applicable to Rome, see, e.g. C.Th.15.1.39, 45,46,47.)

7.6.6

After Augustus, there was just one further attempt to regulate the height of buildings. The regulation was introduced by Trajan, who was concerned at the expensive collapses of buildings and the dangers of fire, and set the limit at 60 feet for dwellings (Aur.Vict.Epit. 13.12-13):

"Eo tempore multo perniciosius quam sub Nerva Tiberis inundavit magna clade aedium proximarum; et terrae motus gravis per provincias multas atroxque pestilentia famesque et incendia facta sunt. Quibus omnibus Traianus per exquisita remedia plurimum opitulatus est, statuens, ne domorum altitudo sexaginta superaret pedes ob ruinas faciles et sumptus, si quando talia contingerent, exitiosos."

This limit of 60 feet would allow buildings to rise to four or five stories above the ground, though it is probable that the rear of the building could rise higher; also, if it applied in the same way as Augustus' restriction of height, it did not rule out the possibility of areas of buildings off the main streets which were much higher.

7.6.7

For the general import of these regulations, we have to note the gaps which the modern eye may discover, and also note the evidence for how buildings were actually built. Apart from the regulations concerning the spacing of private buildings near to public buildings, and the restrictions on height, there was very little to regulate the nature of private buildings (including the numerous insulae, tenement blocks). It is not clear whether Nero's instructions concerning the use of stone and timber remained in force when many of the new buildings came to be built in brick-faced concrete, and it is probable that throughout the period there were buildings which were not built to the highest possible standards; in addition, there will always have been a residue of older building which created a risk. There was no limit imposed by law on the maximum size of a building, and it was only the practice of using fairly small rooms in the tenements which prevented the risks from being really bad. On the engineering side, we have seen that Vitruvius knew the properties of the various materials and type of construction fairly well, but that special fire-resisting devices such as

smoke doors were not thought of; again, the practice of lighting rooms from the outside meant that normally a building would not be more than two rooms thick and that firefighting was consequently easier. It was also of assistance to firemen if the staircases opened out onto balconies or porticoes above ground level, since this would have kept them fairly free from smoke.

The problem which remained is very like the modern one: that cost was a major restriction, that professional knowledge and skill did not spread far enough, and that it was not practicable either to make very strict laws or to enforce the existing laws completely. The praefectus vigilum must have been frustrated by building laws and practices, he was not concerned with the enforcement of the building regulations, and there was nothing which corresponded to the modern fire certificate. The prefect would, however, give advice according to his inclination and experience, and Nero's regulations, which stand out for their quality and practical sense, have the stamp of a fireman's experience. The porticoes, in particular, provided a solution to a perpetual problem which firemen face, that of access to a building. Also, the instruction to keep firefighting equipment in the houses shows good sense, but this, like the power to flog careless people (Dig. 1.15.3-4), does not really amount to any more than first-aid for fires that have already broken out. Since the praefectus vigilum was not directly concerned with the enforcement of building regulations, his duties in fire prevention were far less than those now carried out by a Fire Prevention Officer.

7.6.8

It must be admitted that probably the laws were made as powerful as was practicable, and in some ways the situation in ancient Rome is paralleled by the situation in Hong Kong at the present time. There, the authorities admit that the standard of building of some of the tenements is not as high as is desirable, but that since the alternative to some people losing their lives in fires is for a far greater number to die in the streets, the lower standard of housing is acceptable. In law, in fact, the praefectus vigilum was served as well as was practicable by the building regulations. It was greatly to his benefit that the change to brick-faced construction came when it did, and that the standard of new building thus improved.

7.6.9

The other laws with which he was concerned included special provisions relating to fire, and in order to assess his potential effectiveness we turn now to these other laws.

7.7.1

It is generally known that the praefectus vigilum had functions other than firefighting. What is less clearly established is the balance between the firefighting and the non-firefighting functions. The situation is further complicated by the fact that, when set down on the page, there is a far greater bulk of legal evidence for the non-firefighting functions than for the firefighting. Mommsen (1887,II,1057) observed that under the Republic night duties and a police function were united with each other, and seems to leave it simply as a matter of following precedent that the Vigiles seem to have combined the two roles. BR does not go deeply into the question, but he does seem to believe that the non-firefighting functions

were responsible for a rise in the standing of the prefect (pp.30-40). There are two aspects which have to be distinguished here: the extent of the powers concerned with firefighting, and the extent to which the set of powers and responsibilities formed a coherent whole. We should not lose sight of the fact that the patrols carried with them axes and buckets, which implies that firefighting was their primary function. How far, then, did the prefect have jurisdictions which bore no close relation to the main duties of the men, and how should we explain the range of jurisdictions which he carried?

7.7.2

The legal formulations of the prefect's powers and responsibilities may be identified either because they actually name the prefect or else because they are to be found in one of the books "De officio praefecti vigilum" of either Paulus or Ulpian. In the interests of clarity, a collection of the legal texts is given below (believed to be complete), including also some of the laws relating to arson with which the prefect must have been concerned and the inscription VI.266, which records the judgments of three praefecti vigilum in a case concerning the use of a fountain. These are followed by summaries which are intended to show the range of the prefect's functions though without actually being a statement of the prefect's duties such as would satisfy a lawyer: indeed, the significance of some of these passages is much disputed.

Digest

1.15: De officio praefecti vigilum

A 3. Paulus libro singulari de officio praefecti vigilum

nam salutem rei publicae tueri nulli magis credidit convenire nec alium sufficere ei rei, quam Caesarem. itaque septem cohortes opportunis locis constituit, ut binas regiones urbis unaquaeque cohors tueatur, praepositis eis tribunis et super omnes spectabili viro qui praefectus vigilum alpellatur. cogniscit praefectus vigilum deincendiariis effractoribus furibus raptoribus receptatoribus, nisi si qua tam atrox tamque famosa persona sit, ut praefecto urbi remittatur. et quia plerumque incendia culpa fiunt inhabitantium, aut fustibus castigat eos qui negligentius ignem habuerunt, aut severa interlocutione comminatus fustium castigationem remittit. effracturae fiunt plerumque in insulis in horreisque, ubi homines pretiosissimam partem fortunarum suarum reponunt, cum vel cella diffringitur vel armarium vel arca: et custodes plerumque puniuntur, et ita divus Antoninus Erucio Claro rescripsit. ait enim posse eum horreis effractis quaestionem habere de servis custodibus, licet in illus ipsius imperatoris porti esset. sciendum est autem praefectum vigilum per totam noctem vigilare debere et coerrare calciatum cum hamis et dolabris, ut curam adhibeant omnes inquilinos admonere, ne neglegentia aliqua incendii casus oriatur. praeterea ut aquam unusquisque inquilinus in cenaculo habeat, iubetur monere. adversus capsarios quoque, qui mercede servanda in balineis vestimenta suscipiunt, iudex est constitutus, ut, si quid in servandis vestimentis fraudulenter admiserint, ipse cognoscat.

B 4. Ulpianus libro singulari de officio praefecti urbi

imperatores Severus et Antoninus Iunio Rufino praefecto vigilum ita rescripserunt: 'insularios et eos, qui neglegenter ignes apud se habuerint, potes fustibus vel flagellis caedi iubere: eos autem, qui dolo fecisse incendium convincentur, ad Fabium Cilonem praefectum amicum nostrum remittes: fugitivos conquirere eosque dominis reddere debes'.

11.4 De fugitivis

C 1. Ulpianus libro primo ad edictum

in publicum deduci intelleguntur qui magistratibus municipalibus traditi sunt vel publicis ministeriis. diligens custodia etiam vincire permittit. tamdiu autem custodiuntur, quamdiu ad praefectum vigilum vel ad praesidem deducantur. eorumque nomina et notae et cuius se quis esse dicat ad magistratus deferantur, ut facilius adgnosci et percipi fugitivi possint (notae autem verbo etiam cicatrices continentur): idem iuris est, si haec in scriptis publice vel in aedes proponas.

12.4 De condictione causa data causa non secuta

D 15. Pomponius libro vicensimo secundo ad Sabinum

cum servus tuus in suspicionem furti Attio venisset, dedisti eum in quaestionem sub ea causa, ut, si id repertum in eo non esset, redderetur tibi: is eum tradidit praefecto vigilum quasi in facinore deprehensum: praefectus vigilum eum summo supplicio adfecit. ages cum Attio dare eum tibi oportere, quia et ante mortem dare tibi eum oportuerit. Labeo ait posse etiam ad exhibendum agi, quoniam fecerit quo minus exhiberet. sed Proculus dare oportere ita ait, si fecesses eius hominem, quo casu ad exhibendum agere te non posse: sed si tuus mansisset, etiam furti te acturum cum eo, quia re aliena ita sit usus, ut sciret se invito domino uti aut dominum si sciret prohibiturum esse.

19.2. Locati conducti

E. 12. Hermogenianus libro secundo iuris epitomarum

sed et si quilibet extraneus ignem iniecerit, damni locati iudicio habebitur ratio.

F 56. Paulus libro singulari de officio praefecti vigilum

cum domini horreorum insularumque desiderant diu non apparentibus nec eius temporis pensiones exsolventibus conductoribus aperire et ea quae ibi sunt describere, a publicis personis quorum interest audiendi sunt. tempus autem in huiusmodi re biennii debet observari.

20.2 In quibus causis pignus vel hypotheca tacite contrahitur

G 9. Paulus libro singulari de officio praefecti vigilum

est differentia obligatorum propter pensionem et eorum, quae ex conventione manifestari pignoris nomine tenentur, quod manumittere mancipia obligata pignori non possumus, inhabitantes autem manumittimus, scilicet antequam pensionis nomine percludamur: tunc enim pignoris nomine retenta mancipia non liberabimus: et derisus Nerva iuris consultus, qui per fenestram monstraverat servos detentos ob pensionem liberari posse.

47.2 De furtis

H 57. Iulianus libro vicensimo secundo digestorum

qui furem deducit ad praefectum vigilibus vel ad praesidem, existimandus est elegisse viam, qua rem persequeretur: et si negotium ibi terminatum et damnato fure recepta est pecunia sublata in simplum videtur furti quaestio sublata, maxime si non solum rem furtivam fur restituere iussus fuerit, sed amplius aliquid in eum iudex constituerit. sed et si nihil amplius quam furtivam rem restituere iussus fuerit, ipso, quod in periculum maioris poenae deductus est fur, intellegendum est quaestionem furti sublatam esse.

47.17 De furibus balneariis

I 1. Ulpianus libro octavo de officio proconsulis

fures nocturni extra ordinem audiendi sunt et causa cognita puniendi, dummodo sciamus in poena eorum operis publici temporarii modum non egrediendum. idem et in balneariis furibus. sed si telo se fures defendunt vel effractores vel ceteri his similes nec quemquam percusserunt, metalli poena vel honestiores relegationis adficiendi erunt.

2. Marcianus libro secundo iudiciorum publicorum

sed si interdiu furtum fecerunt, ad ius ordinarium remittendi sunt.

47.18 De effractoribus et expilatoribus

K 1. Ulpianus libro octavo de officio proconsulis

Saturninus etiam probat in eos, qui de carcere eruperunt sive effractis foribus sive conspiratione cum ceteris, qui in eadem custodia erant, capite puniendos animadvertendum : quod si per neglegentiam custodum evaserunt, levius puniendos.

L sed enim divus Marcus effractorem equitem Romanum, qui effracto perforatoque pariete pecuniam abstulerat, quinquennio abstinere iussit provincia Africa, unde erat, et urbe et Italia. oportebit autem aeque et in effractores et in ceteros supra scriptos causa cognita statui, prout admissum suggerit, dummodo ne quis in plebeio operis publici poenam vel in honestiore relegationis excedat.

M 2. Paulus libro singulari de officio praefecti vigilum

inter effractores varie animadvertitur. atrociores enim sunt nocturni effractores, et ideo hi fustibus caesi in metallum dari solent: diurni vero effractores post fustium castigationem in opus perpetuum vel temporarium dandi sunt.

Sententiae receptae Paulo tributae

I.VI^{A} (F.I.R.A. ii, p.326): De fugitivis

N fugitivi, qui a domino non agnoscuntur, per officium praefecti vigilum distrahuntur.

V.XX (F.I.R.A. ii, p.406): De incendiariis

O 1. incendiarii, qui in oppido praedandi causa faciunt, capite puniuntur.

P 2. qui casam aut villam inimicitiarum gratia incenderunt, humiliores in metallum aut in opus publicum damnantur, honestiores in insulam relegantur.

Q 3. fortuita incendia, quae casu venti ferente vel incuria ignem supponentis ad usque vicini agros evadunt, si ex eo seges vel vinea vel olivae vel fructiferi arbores concrementur, datum damnum aestimatione sarciatur.

R 4. commissum vero servorum si domino videatur, noxae deditione sarcitur.

S 5. messium sane per dolum incensores, vinearum olivarumve aut in metallum humiliores damnantur, aut honestiores in insulam relegantur.

C.J.

1.43 De officio praefecti vigilum

I Imppp. Valentinianus Theodosius et Arcadius AAA. Nebridio p.v. praefecti vigilum huius urbis nihil de capitalibus causes sua auctoritate statuere debent, sed si quid huiusmodi evenerit, culmim tuae potestatis referre, ut de memoratis causis celsiore sententia iudicetur.

[a,385-389]

U VI.266

Herculi sacrum posuit | P. Clodius Fortunatus q(uin)-q(uennalis) perpetuus huius loci. |

Interlocutiones | Aeli Floriani, Herenni Modestini et Faltoni | Restutiani praef(ectorum) vigil(um) p(erfectissimorum) v(irorum). |

Florianus d(ixit): Quantum ad formam a me datam perti|net, quoniam me convenis, de hoc inprimis tractandum|est. Ita interlocotum me scio esse hesterna | die: docere partem diversam oportere hoc | ex sacra auctioritate descendere, ut pensiones | non dependerentur. Et respondit se quibus |-sumque rationibus posse ostendere hoc | ex sacra auctoritate observari. Et hodie hoc|dicit: ex eo tempore, inquit, ex quo Augustus|rem publicam obtinere coepit, usque in hodier|-num [num] quam haec loca pensiones pensitasse. |

Et infra Florianus d(ixit): Vidi locum dedicatum imaginibus sacris.

Et alio capite. | Modestinus d(ixit): Si quid est iudicatum, habet suam auctoritatem, si est, ut dixi, iudicatum. | Interim aput me nullae probationes exhi|[be]ntur, quibus doceantur fullones in pen|[sione]m iu[r]e conveniri.

Et alio capite. | R[est]it[utia]nus c(um) c(onsilio) c(ollocutus) d(ixit): Manifestum est, quid | iudicav[erint] p(erfectissimi) v(iri). Nam Florianus partibus | suis diligentissime functus

est, qui, cum in | rem praesentem venisset, locum inspexit | et universis indiciis examinatis senten|tiam de eo loco, de quo cum maxime | qu[a]eritur, protulit; a qua provoca[tum] | non est.

Et infra Restitutianus d(ixit): | Modestinus quoque secutus res | a Floriano iudicatas pensiones | exigi probibuit.

Et infra Restitutionus d(ixit): Illut servabitur | fontanis, quod obtinuerunt|aput suos iudices et quod habue|runt in hodiernum sine pensione. |

Ex Alexandre Aug.II et Marcello II cos[= A.D.226] litigatum est in | Peregrino et Aemiliano cos. [= A.D.244] dies...

Adiectum in examplo b:

Actum IIII idus Mar(tias) ann(i), [q]uo victoriam percepimus.

V Dig.47.9: De incendio ruina naufragio rate nave expugnata

1-3 deals with property salvaged or stolen after ship fires (not discussed below because the legal aspects would take us far from the theme of this thesis, though its existence is worth noting).

7.7.4

Firefighting and fire prevention

Each of the seven cohorts had to look after two Regions (A). The praefectus vigilum could beat or flog those who kept their fires negligently (A,B), or could remit this punishment after a severe reprimand and threat of punishment (A). He had to remain on watch all night and go out on patrol wearing boots and equipped with buckets and axes (A). He had to advise all tenants to take care to prevent an outbreak of fire through negligence (A). He also had to advise every tenant to keep some water upstairs (A).

Incendiaries

The praefectus vigilum held trials of incendiaries (A,B). Those convicted of malicious arson had to be sent on to the praefectus urbi (B).

In general: those who started fires for the purpose of looting were executed (O);

those who burned a cottage or villa out of enmity were, if *humiliores*, sentenced to the mines or public works, or, if *honestiores*, relegated to an island (P);

in the case of accidental fires which damaged a neighbour's crops or trees, there was no punishment but compensation was payable (Q);

a court had to decide the amount of damage to rented property if a stranger threw fire in (E);

if a slave caused a fire, he could be handed over for punishment if his owner agreed (R);

malicious arson of the harvest, whether of vines or olives, was punished by sentencing to the mines for *humiliores* or relegation to an island for *honestiores* (S).

Thieves (fures)

The *praefectus vigilum* held trials of thieves (A,D,H). There was (probably) a distinct procedure used by the *praefectus vigilum* and by *praesides* (H). He could execute a slave for theft (D: where the particular dispute concerned the return to the owner of the body of a slave executed for theft). Nocturnal theft was worse (I and J), and carried heavier penalties provided that punishment did not exceed temporary public work (I). A thief who defended himself with a weapon but without actually striking anyone was punished by sentencing to the mines if *humilior* or by relegation to an island if *honestior* (I). Theft from the baths was treated in the same way as ordinary theft (I; cf. A). The *praefectus vigilum* held trials of *capsarii* who were paid to look after clothing in the baths and who abused their trust (A).

Robbers (raptores)

The *praefectus vigilum* held trials of robbers (A).

Housebreakers (effractores): (both breakers-in to property, and breakers-out of jail)
The praefectus vigilum held trials of housebreakers (A). He could torture the slave guards of horrea, even those of the emperor (A).

In general: the death penalty was prescribed for those who broke out of prison though the punishment was lighter if the guards had been negligent (K);

housebreaking with theft should not be punished with worse punishments than public work for humiliores or relegation for honestiores (L);

housebreaking by night was worse than by day, and the former was punished by beating and sending to the mines, the latter by beating followed by lifelong or temporary work (M);

unsuccessful use of a weapon by a housebreaker was treated in the same way as for a thief (I).

Receivers (receptatores)

The praefectus vigilum held trials of receivers (A).

Runaway slaves

The praefectus vigilum had to search for runaway slaves and return them to their owners (B). Runaway slaves had to be kept under guard, bound if necessary, until they were taken to the praefectus vigilum or the praeses and their descriptions published (C). Runaway slaves who were not claimed by their owners were sold by the officials of the praefectus vigilum (N).

Defaulting tenants

If, after two years of absence of tenants and non-payment of rents, the owners of horrea and insulae wished to go in and make an inventory, their case had to be considered by the relevant public officials (i.e. including the praefectus vigilum) (F).

Pledged slaves

[In some unspecified way the praefectus vigilum seems to have been concerned with] the difference between slaves pledged on account of rents and slaves held in lieu of a manifest security (G).

In general: the praefectus vigilum could not try capital cases, but had to refer them to the praefectus urbi (A,T).

7.7.5

It has been put to me in discussion that the powers which the praefectus vigilum possessed for the purposes of firefighting were fairly restricted, amounting to no more than the right of entry (deduced from Petronius Sat. 78) and the right to flog (explicitly recorded in the Digest). BR (pp. 30-40), as we have noted, is not specially clear on this point. There are two considerations which help us to gauge the practical implications of the prefect's known powers. First and foremost, on the practical side he was responsible for the nightly fire patrols, and had initially 3,500 men under him, later 7,000. Secondly, he had a legal responsibility to protect the community from fire, and it will be noted that each cohort was required to protect two Regions. Thus both the scale of his operations and the wide responsibility which he carried point to the probability that the prefect had as much power as he needed. There is not a precise definition of everything that he might need to do for the purposes of firefighting, instead he is given power generally to do whatever he thought necessary. In this light, the particular mention of the power to flog or beat is made simply because there had to be provision for the prefect to act in a situation when the law had not actually been broken: it was not an offence to look after a fire negligently, nor was it an offence to ignore the advice of the prefect (Nero's requirement that firefighting equipment be kept upstairs might not have had the force of law); and it enabled a situation to be dealt with easily which could have provoked a lot of difficulty if something more formal like a

trial had to be held.

7.7.6

In fact, the general terms of reference are very similar to those laid down by the Fire Services Act, 1947, which governs the modern British arrangements for firefighting. These are of considerable relevance here because they are the formulation of powers which fire officers generally feel to be wide and adequate for their operations. Section 30 of the Act is the part which corresponds most closely to Dig. 1.15.3, and sub-section (1) sets out the powers and responsiblities as follows;

> "(1) Any member of a fire brigade maintained in pursuance of this Act who is on duty, any member of any other fire brigade who is acting in pursuance of any arrangements made under this Act, or any constable, may enter and if necessary break into any premises or place in which a fire has or is reasonably believed to have broken out, or any premises or place which it is necessary to enter for the purposes of extinguishing a fire or of protecting the premises or place from acts done for firefighting purposes, without the consent of the owner or occupier thereof, and may do all such things as he may deem necessary for extinguishing the fire or for protecting from fire, or from acts done as aforesaid, any such premises or place or for rescuing any person or property therein."

Here, the special grant of the right to force an entry is accorded to prevent the act being criminal, but otherwise the powers and the duties are set out in very general terms: it would be hard to deduce any firefighting techniques from this section. Other sub-sections of Section 30 deal with wilful obstruction of the fire brigade (2), the use of equipment and the obtaining and use of water (3), the use of a public water supply and relations with the water undertaker (4), and relations with the police in the matter of traffic control (5). These latter three sub-sections are to regulate actions which involve other legally established arrangements, and reflect a particular social situation. Even the part of the Act which sets out the responsibilities of fire authorities

(sub-section (1) of Section 1) does so in general terms, and in fact singles out, in paragraphs (b) to (f), those particular responsibilities which impinge on other statutory arrangements. Sub-section (1) reads as follows:

"It shall be the duty of every fire authority in Great Britain to make provision for fire-fighting purposes, and in particular every fire authority shall secure -

(a) the services for their area of such a fire brigade and such equipment as may be necessary to meet efficiently all normal requirements;

(b) the efficient training of the members of the fire brigade;

(c) efficient arrangements for dealing with calls for the assistance of the fire brigade in case of fire and for summoning members of the fire brigade;

(d) efficient arrangements for obtaining, by inspection or otherwise, information required for fire-fighting purposes with respect to the character of the buildings and other property in the area of the fire authority, the available water supplies and the means of access thereto, and other material local circumstances;

(e) efficient arrangements for ensuring that reasonable steps are taken to prevent or mitigate damage to property resulting from measures taken in dealing with fires in the area of the fire authority;

(f) efficient arrangements for the giving, when requested, of advice in respect of buildings and other property in the area of the fire authority as to fire prevention, restricting the spread of fires, and means of escape in case of fire."

There are two other specific provisions which are of importance for firefighting. One relates to the supply of water (Section 13): "A fire authority shall take all reasonable measures for ensuring the provision of an adequate supply of water, and for securing that it will be available for use, in case of fire." and under Section 14 it is provided that the fire authority may have to pay for the arrangements which it requires.

The other relates to what may appear to be a minor matter, the indication of the position of a hydrant by a notice or distinguishing mark [Section 14, (3) (a)] ; this paragraph is useful in dealing with members of the public who object to having notices or marker-posts fixed on their property, and possibly it has to quoted more often than the other provisions.

Only one section of the Act refers to equipment at all specifically. This reads as follows [30, (2)] : "At any fire the senior fire brigade officer present shall have the sole charge and control of all operations for the extinction of the fire, including the fixing of the positions of fire engines and apparatus, the attaching of hose to any water pipes or the use of any water supply, and the selection of the parts of the premises, object or place where the fire is, or of adjoining premises, objects or places, against which the water is to be directed." Significantly, hoses are mentioned, being vital for taking water where it is needed; and this helps to emphasise the importance of the duty of the praefectus vigilum to take buckets on the patrols (Dig. 1.15.3).

We can thus see that this formulation of a set of powers which fire officers feel to be very wide and to give full scope for firefighting is quite brief and lacking in technical detail. We need not expect wide powers necessarily to have an extensive legal formulation, and reference to the 1947 Act illustrates the sort of situation which seems to have obtained in Rome. In fact, by saying little the legal authorities conferred great powers. In firefighting, the praefectus vigilum must have been all-powerful.

7.7.7

Such powers are appropriate for what was always regarded as a vital area of law. In the Twelve Tables (8.10) there is the following provision concerning arson (Dig. 47.9.9):

> "Qui aedes acervumve frumenti iuxta domum positum combusserit, vinctus verberatus igni necari iubetur, si modo sciens prudensque id commiserit. Si vero casu, id est neglegentia, aut noxiam sarcire iubetur aut, si minus idoneus sit, levius castigatur. appellatione autem aedium omnes species aedificii continentur."

Meriting the death sentence, malicious arson is the only offence other than killing for which the early law distinguished between deliberate and unintentional performance of the act (for killing: 8.24).

7.7.8

The non-firefighting functions, which it has become customary to refer to as 'police functions', are a very mixed collection. Mommsen (1887,II,1058) suggested that the prefect's jurisdiction started off criminal, and that civil cases were added when they were near-criminal. Jolowicz (1952,347) says that the prefect "tried criminal cases of minor importance and appears in third century to have obtained a civil jurisdiction in some cases". The precise development of the jurisdiction is outside my competence, but it is of interest to see whether the various powers had any characteristic in common.

A striking characteristic which belongs to most of them is that they can cover nocturnal offences, in some cases the penalties being higher for offences if they were committed at night. As such, they would fall naturally to the praefectus vigilum, who was the only official operating at night. Within

this nocturnal category we may reckon the provision concerned with defecting tenants, since the actual flitting is likely to have taken place during the hours of darkness and in addition the patrols will have been able to check on security and to spot suspicious changes. The powers which related to incendiaries and which covered looting will have been exercisable at any time, though it is possible that one additional reason for giving the prefect jurisdiction covering both day and night was to cover offences committed at dusk, when it would not have been practical for the prefect's function to have been closely defined according to the hour. Runaway slaves are also more likely to have been noticed at night, but in this case we may suspect a special, departmental, interest of the prefect, since he had the disposal of the runaway slaves if they were not claimed; and he would have been able to recruit them for the service in the Vigiles if they seemed suitable.

The jurisdiction which was being exercised in the case concerning the fountain (U) offers some interesting problems. The inscription is a little too allusive to make sense on its own, and the case does not have any obvious connection with any of the other legally-attested powers. The judgments were clearly that rents were not to be exacted for the use of a particular fountain, but it does not follow from this that the prefects here were exercising their powers concerned with locatio and conductio. Mommsen in his note in CIL (on VI.266) observes: "Denique qui fiat, ut praefecti vigilum de eiusmodi lite iudicarint, omnium maxime obscurum est." He points out that the prefect's right to the use of any water supply (inferred, as not specifically attested) would not necessarily give him a jurisdiction such as this seems to be (and which might more naturally belong to the curatores aquarum), and offers his suggestion that the fountain in question was within the precincts of a fire

station (an excubitorium, there being no statio in that particular area). This solution was offered in the absence of an alternative, though Mommsen was right not to have thought in terms of a special supply of water for firefighting. But there is one other way in which the prefects could have become involved in the water supply, and that is in the supervision of the aqueducts to prevent the unauthorised abstraction of water. After the fire in A.D. 64 Nero provided that guards were to prevent the depletion of the water supply, so that there always be a maximum quantity available for firefighting (Tac. Ann. 15.43: see 7.3.5). Since unauthorised diversion of the water supply (other than by the staff of the curatores aquarum) would probably have taken place at night, and since the praefectus vigilum should have had a good knowledge of the distribution of the system, the Vigiles would have been suitable for some at least of the surveillance of the supply. In suggesting that the prefect's jurisdiction in this case arose from the duties of the Vigiles, we are not going beyond the letter of the evidence (particularly as it is not known who the custodes were to be), though it has to be admitted that there is no evidence that would clinch the argument. But this solution is preferable to that which Mommsen offers, since it is implausible that a collegium, whether of fontani or of fullones, should have functioned within a fire station.

The other striking characteristic of the prefect's jurisdictions is that they were all concerned with the protection of property. As such, they fit in very well with his firefighting function.

7.7.9

It is worthy of note that the praefectus vigilum did not have the right to use capital punishment, and for the serious offences he had to send convicted persons to the praefectus urbi. The reason for this is that the praefectus vigilum was not a magistrate. In this respect he was in the same position as the praefectus annonae (Dig. 1.2.33):

"nam praefectus annonae et vigilum non sunt magistratus, sed extra ordinem utilitatis causa constituti sunt."

The praefectus vigilum exercised powers in Rome which in the provinces were exercised by the praeses (H) or the proconsul or praeses (N:cf. Paulus I.VIA.4).

7.7.10

For the purposes of firefighting, the praefectus vigilum occupied a position which is the envy of modern firemen, who show particular interest in the right to flog. Although it is difficult to be precise, it does seem that his position was stronger in law than that of the modern British fireman, and is possibly more analogous to the situation in Germany, where, although the law is somewhat complicated, to have a fire is treated as a crime, and a fire is attended by special police investigators. We should expect a fair amount of improvisation and individual treatment in the operations of the Vigiles, and, except for the special case of capital punishment for malicious arson, it is hard to see any way in which the prefect could exceed his firefighting powers. He was not a man to be trifled with.

7.8.1

The strong position of the praefectus vigilum is a natural extension of the high level of concern shown for the ravages of fire. Under the Republic, the efforts of the various magistrates charged with the extinction of fires were supplemented by assistance from the consuls (Cic. In Pisonem, 2.26):

"Ecquod in hac urbe maius umquam fuit incendium cui non consul subvenit?"

This high level of interest was maintained under the Empire, and it extended to several problems arising from fires.

7.8.2

The establishment of the Vigiles by Augustus in A.D.6 was itself an imperial intervention of the utmost importance, and one which derived its effectiveness largely from its imperial backing. Paulus records that Augustus believed that only he could deal with the problem of fire (Dig. 1.15.3):

"Nam salutem rei publicae tueri nulli magis credidit convenire nec alium sufficere ei rei quam Caesarem."

According to Dio (55.26) Augustus set up the corps as a short-term measure, and he thus left himself the option of disbanding them if the experiment was not successful. Their success, however, led to their retention, and so what Augustus had probably hoped for came about. His close interest in the corps is shown by the status of the chief officer, a praefectus being the emperor's own representative.

7.8.3

One of the two acts of public generosity which Suetonius credits to Tiberius was to compensate the owners of insulae on the

Celio which had been burned (Tib.48). According to Suetonius Tiberius himself then had the name of the Celio changed to 'mons Augustus', while Tacitus records that the Senate ordered the change because a statue of the emperor had survived the fire intact (Ann.4.64). This was in A.D.27. Tiberius' other recorded intervention in fire matters (though not the other act of generosity recorded by Suetonius) was to provide 100 million sesterces in compensation for the owners of houses which were burned in a bad fire on the Aventine in A.D.36 (Tac. Ann.6.45; Dio 58.26.5). Livia also intervened at fires, to the annoyance of Tiberius (Suet.Tib.50); she is said to have encouraged the people and soldiers in person, and to have made a habit of this while Augustus was alive. (The incident to which Suetonius refers belongs probably to A.D.16: Werner 1906,15).

Caligula also helped many people after fires (Suet.Cal.16), and in A.D.38 intervened in person (Dio 59.9.4), helping the 'soldiers' (τῶν στρατιωτῶν) to extinguish the fire and assisting the victims.

Suetonius records that Claudius (before he was emperor) had his house rebuilt by Tiberius after the Senate had decreed that it would pay for the rebuilding after a fire (Claud.6):

> "Senatus quoque . . . censuit et mox ut domus ei, quam incendio amiserat, publica impensa restitueretur . . . Quod decretum abolitum est. . . Tiberio . . . damnum liberalitate sua resarturam pollicente."

Werner (pp.14f) supposes that this was the fire which destroyed Caligula's house in A.D. 41, a short while after Caligula's death (Suet.Cal.59), but this is chronologically impossible. Similar assistance had been rendered to Augustus as emperor by the veterans, decuries and tribes, and

by individuals, after his palace had been burned (A.D.3), and Augustus had taken care not to accept from any individual more than he could afford and in any case not more than 1 denarius (Suet. Aug.57) He then opened the whole of the palace to the public (Dio 55.12.5), part of it having been open since 13 B.C. (Dio 54.27.3). Claudius played a rather unusual part in firefighting when he took action to supplement the official manpower in A.D.54 (Suet.Claud.18). Having brought his own slaves into action to help the 'milites', he then had the magistrates summon the people to help from all over Rome, and rewarded them with money according to their efforts. This could have been the fire at which Agrippina assisted (Werner p.18; Dio 61.33.12 = Zonaras 11.11).

The fire which provoked the most far-reaching imperial intervention was that of A.D.64. We have seen that is is possible to divine some of the firefighting realities from the tendentious accounts of Tacitus, Suetonius and Dio (see 7.3.5), and we have further statements as to the public relief provided by Nero. His first move seems to have been the provision of temporary accommodation ('subitaria aedificia') in the Campus Martius, in the buildings of Agrippa (also in the Campus Martius), and in his own garden, provision of the necessities of life from Ostia and neighbouring towns, and a reduction in the price of grain (Tac.Ann.15.39). The overall costs of rehabilitation were shared by a large part of the Empire (Ann.15.45):

> "Interea conferendis pecuniis pervastata Italia, provinciae eversae, sociique populi et quae civitatium liberae vocantur."

Dio (62.18.5) says that Nero collected money from provinces and communities by compulsion, using the fire as a pretext, and making the

contributions appear to be voluntary; one need not be biassed against Nero to recognise that there could have been some justifiable resentment at this special treatment for the capital.

For the rebuilding, the streets were replanned on a more open scale, and with open spaces to act as fire breaks, the methods of building were improved (see 7.6.4), and Nero offered to clear the debris at his own expense, removing it to the marshes of Ostia in the empty grain ships as they went downstream; he also offered rewards to people who completed their rebuilding within a prescribed period. He offered to pay for porticoes across the fronts of buildings (see 7.6.4), and ordered that water be kept ready for firefighting. All these measures are listed at Annals 15.43. Probably some sites remained vacant after this fire and formed part of the subject of Vespasian's regulations that anyone might occupy sites left vacant after fires and build on them if the owners did not do so (Suet. Vesp.8). However, both our own knowledge of the street plan of Rome and also the complaint that the streets were now too open and unsheltered (Tac.Ann. 15.43) show that the replanning was largely successful.

After the Vitellians had burned the Capitol in A.D.69, Vespasian symbolically started the work of reconstruction (Suet.Vesp.8):

> "Ipse restitutionem Capitolii adgressus ruderibus purgandis manus primus admovit ac suo collo quaedam extulit."

We hear of only one more direct imperial intervention in firefighting, by Commodus at the bad fire in A.D.192, when he came in from the outskirts of the City and encouraged the firefighters (Dio 73.24.3).

7.8.4

There are, of course, very many instances of imperial assistance and interest in rebuilding after fires, attested in the majority of cases epigraphically but in quite a few cases in the literary sources. Werner gives many examples, and they need not be rehearsed here. What is worthy of note is the way in which the emperor intervened in some of the more symbolic and spectacular cases. We have already noted Vespasian's part in the restoration of the Capitol. Domitian, too, initiated the efforts to restore the library on the Palatine, which had been burned (A.D.88-91), as recorded by Suetonius (Dom.20):

> "Liberalia studia imperii initio neglexit, quanquam bibliothecas incendio absumptas impensissime reparare curasset, exemplaribus undique petitis missisque Alexandream qui describerent emendarentque."

After the fire in A.D.80 we hear of another type of symbolic start to rebuilding (of the Capitol again), this time in the Acta of the Fratres Arvales (Henzen, 1874, p.CVI):

> "VII Idus Decembres in Capitolio in aedem Opis sacerdotes convenerunt ad vota numcupanda ad restitutionem et dedicationem Capitoli ab imp(eratore) T(ito) Caesare Vespasiano Aug(usto)."

7.8.5

The use of imperial titles (e.g. Antoniniana, Gordianae) is the only attested method of honouring the corps of Vigiles (BR pp.64f. gives references), and this may have been a more or less routine practice of the third century. Individual vigiles were not decorated (Maxfield 1972,I,107), not being in a fighting unit, and in general lacking ingenuitas. Promotion could be a reward (Maxfield ibid.123), but there were few openings in the Vigiles. Rome appears not to have been greatly concerned to honour its firemen.

7.9.1

BR describes the Republican arrangements for firefighting as "insufficient and somewhat haphazard" (p.19), and it is impossible to disagree. In his outline of them (pp.18f), he shows that in addition to the regular magistrates who took on firefighting duties from time to time there was a special board of _triumviri nocturni_. According to Valerius Maximus (8.1. _Damn._ 6 and 5), one of these was convicted

"quia vigilias neglegentius circumierat".

and a whole board was condemned because

"ad incendium in sacra via ortum extinguendum tardius venerant".

The term '_vigiliae_' implies night duty, and '_circumire_' implies patrols, and, for as long as the board lasted, there will have been night patrols such as the _Vigiles_ carried out, though with only a fraction of the manpower. In this we can see the essence of the _Vigiles'_ own mode of operation.

7.9.2

Although BR seems to imply (p.22) that the corps of _Vigiles_ as far as possible was founded on Republican precedents, he also says (p.95):

"The view has constantly been held that the Roman Vigiles were modelled by Augustus on the fire brigade of Alexandria"

and refers to Strabo (17.1.12) for a νυκτερινὸς στρατηγός at Alexandria (p.95 n.4). There is no other evidence for this official. Fraser (1972,I,97f) points out that Strabo tells us very little, and comments:

"The importance assigned to the Night General is certainly surprising. If, as might be supposed, he was head of the City Watch, it is curious that his duties should, to judge by his title, have been confined to the night. The prominence assigned to the office by Strabo is perhaps to be explained by his acquaintance with the Roman _praefectus vigilum_, the commander of the _Vigiles_, who was probably modelled on the Alexandrian institution".

There were similar officials in other cities (Fraser, 1972,II p.180 n.34): a νυκτοστράτηγος, possibly at Oxyrhynchus, in the second century A.D., and another at Hermoupolis, attested in A.D.390; also at Tralles and Ptolemais, both of Roman date. A νυκτέπαρχος is attested in the fifth-century sources for Antioch (Liebeschuetz 1972, 124). Probably all these officials had their origins in the pre-Roman arrangements. The post at Alexandria, according to Strabo, went back to the time of the kings (17.1.12):

"ἦσαν μὲν καὶ ἐπὶ τῶν βασιλέων αὗται αἱ ἀρχαί".

In the absence of any direct evidence that the Vigiles were modelled on the arrangements at Alexandria, we must look at other possible precedents before committing ourselves.

7.9.3

According to the currently accepted view (e.g. Sherwin-White 1966, 607-610; Jones 1940, 215) there were no organised corps in the eastern part of the empire for firefighting. Although this does broadly seem to be true,it is perhaps worth remembering that the existence of the night-prefects ought to imply at least a small number of men under them even though these men have left absolutely no trace. Probably the prefects had very small staffs, and had to rely on the populace when there was any extensive need for manpower. In addition, it was possible for them to rely on the army, when it was available. There is very little evidence for the use of the army in civilian firefighting, though once attested it may be reckoned to have been not uncommon.

Safrai (1971,226) records the following incident from a divergent Talmudic ruling "dating approximately from the time of the destruction of the Temple":

> "A fire broke out on the Sabbath in the yard of Rabbi Joseph ben Simai of Sikhin and the garrison of the castra of Sepphoris came to put it out, but he would not permit them and a cloud came down and extinguished it. And the sages said that there was no need (to prohibit them): nevertheless at the end of the Sabbath he sent a sela' [= 4 denarii] to each of them and 50 dinars to their Hipparchus."

Safrai goes on to suggest that ben Simai was close to Roman government circles (p.227), but this need not have been the main reason for the turn-out. The Life of Polycarp by Pionius attests both the provision of equipment by the city of Smyrna and also a special interest of the Jews in firefighting (28: Lightfoot 1885, 1042 and 1083):

> "And another miracle also was wrought by his hands as follows. When all the people in the city had gone to sleep and it was near midnight, and the bakers were making bread, it happened that fire falling on the faggots near at hand set the shop in flames, and spreading thence got hold of a very considerable part of the city. But when the people had run together and there was much shouting and confusion, the στρατηγός ordered the equipment which was prepared for this purpose to be brought up. So the pumps and water and every contrivance were brought. The Jews also came down under pretence of being able to extinguish it, since they always present themselves uninvited at a fire: for they assert that conflagrations cannot possibly be stopped in any other way but by their presence. This is an artifice of theirs to plunder the property in the houses. As the city was then in danger, the στρατηγός said:
>
> > 'Sirs . . . you see that it is of no use, because the wind is contrary; and when our only hope was in the Jews we have failed even in this. What do I advise? . . . Send for Polycarp '"

There is a lacuna in the text, but the next section (29) shows that Polycarp was successful, since he was called in again because of his success. Ostensibly the incident should have taken place in the second

century A.D., but there is some doubt as to the date of the Life, and Lightfoot concludes (1885, 1013): "It has no other value than as representing the opinions and practices of the latter half of the fourth century." Be this as it may, the non-miraculous parts of the incident must have been repeated time and again in the eastern cities. It may be wondered how often the equipment which was provided proved useless owing to the lack of trained personnel.

The same sort of situation is attested in Pliny's correspondence with Trajan (Ep. 10.33: Pliny to Trajan; 10.34: Trajan's reply). Here, Pliny, as governor of Bithynia, suggests that after a bad fire in Nicomedia it might be useful to arrange for a collegium of fabri to be established to act as a fire brigade, consisting of no more than 150 men. Trajan replied that there was enough disorder in the cities already, and that the inhabitants should help at fires and keep firefighting equipment in their houses. The threat to local government was uppermost in Trajan's mind, and outweighed his assessment of the dangers from fire. Sherwin-White tries to find a practical justification for Trajan's attitude, commenting (on Ep.10.34.2):

> "Trajan's preference for private enterprise is not so silly as it sounds. The close buildings and crowded streets of the ancient city must have made it difficult to bring fire-brigades into action. Concentration on house-brigades and dispersal of instruments might be more effective than centralization."

From the technical point of view, a firemen might feel that even in the difficult conditions of the eastern cities the use of a well-run brigade was far better than any number of untrained, unprepared and panicky inhabitants; and it may be wondered how the provision of private equipment would have helped with the fire which aroused Pliny's concern. In the

conditions of the eastern cities, a fireman planning for reliable protection against fire would probably tend to count all the inhabitants as unreliable. Moreover, it is doubtful whether the conditions in Rome were any better; taking into account the size of Rome and the number of people, we may feel sure that Rome's difficulties were far worse, and yet the Vigiles could function. It is better to take Trajan's reply at its face value, and his recommendation of private preparations against fire should be seen as a pis aller and a tossing off of responsibility onto the inhabitants. Perhaps the best general statement of the situation in the east is that where there were already existing arrangements they could continue in force, but that no new bodies were allowed to form.

7.9.4

The solution which Pliny proposed for Nicomedia was one which was commonly used in the west, where collegia of fabri, centonarii and dendrophori served as fire brigades. These were respectively builders, blanket-makers and providers of heavy transport (see de Ruggiero, s.vv).

Their use in firefighting is attested in the first place by the evidence of Pliny, and secondly by a brief statement by Symmachus in a letter to Valentinian, in which he lists the functions of the various corporations (Rel.14.3):

" . . per alios fortuita arcentur incendia."

This probably refers to the period when the Vigiles no longer existed in their old form (see Appendix II), but is none the less evidence for the use of collegia, in general. Sherwin-White sets out the legal position of these collegia in his commentary on the correspondence between Pliny and Trajan (1966, 607-610), and to the references which he gives may be added Dobson (1966,67f) on the praefecti fabrum in the municipalities. It is clear that these collegia,

acting singly, in pairs, or all together, would have been capable of effecting rescues, and could also have had a chance of being able to extinguish fires (see 4.25.5). It was probably their firefighting function which led to them being known as the "tria collegia" and the "collegia principalia". The praefectus fabrum in a municipality was probably expected to take charge at fires.

The brigades based on the collegia correspond closely to the modern part-time volunteer brigades. It is probable that the constitutions of the collegia provided an organisation suitable for firefighting, with the centuriae, decuriae, centuriones, optiones and principales lending a military appearance, and for this reason these brigades also resemble the former police-brigades of Britain in having a certain degree of organisation and discipline available at very short notice. There may also have been small bodies of regular fire-fighters in the cities which had their own local praefecti vigilum (BR 114), though nothing is known of these. It would appear that the west should have been better protected against fire than the east, simply because some sort of organisation was permitted; how successful they actually were must be left to conjecture, and no doubt there were wide variations in quality. Possibly the fact that they were allowed to continue in existence is some measure of their success.

7.9.5

Otherwise, both in the east and in the west, all the firefighting arrangements were military. Before the Vigiles sent a vexillation to Ostia this port was protected by one of the Urban Cohorts (Suet.Claud.25), as was Puteoli, though it is less likely that the Vigiles sent a vexillation there. X.1767 and 1768 suggest that vigiles had their home at Puteoli, but this is not evidence for a vexillation. We have seen that there were vexillations at Ostia

and Portus from the time of Hadrian and Antoninus Pius respectively (6.5.1), detached from the Vigiles stationed in Rome. And it is probable that in Rome itself, the Vigiles were assisted when necessary by the Praetorians.

7.9.6

The fact remains that only Rome and her two ports were protected by a full-time professional brigade, and this is a reflection both of the greater fire risks and also of the position of Rome as the capital, with greater resources and with greater checks in case the fire brigade should prove violent or disloyal.

7.9.7

So far as it is possible to find precedents for the operations of the Vigiles, they may seem to lie with the army rather than with the arrangements at Alexandria. Fire was used as an offensive and defensive weapon, and the manual of Aeneas Tacticus, written in the middle of the fourth century B.C. to describe various devices for use when under siege, sets out a range of techniques which are seen in use in later writings, notably by Caesar. Such techniques were standard, and at their first appearance in Aeneas' manual they seem already fully developed.

Since military firefighting is a subject which tends to be forgotten, it may be useful to note the passages from Aeneas which illustrate the techniques in use as early as the fourth century (historical sources show some of them in use even earlier), and to remember that this manual and others based upon it served as a guide to Roman generals. They are as follows:

23.6 Nor again should a leader inconsiderately go out at night with a crowd, because at such times some of the conspirators are forming plots, some within, some without the city, wishing to lure one out with deceptions such as beacon-torches, setting fire to a dockyard, or gymnasium, or a public temple, or some building on account of which a crowd of men - and influential men too - might rush out.

28.6-7 And Iphiades of Abydus on the Hellespont, in his capture of Parium, among other preparations for scaling the wall by night, secretly prepared wagons filled with brush and brambles and sent them to the wall (the gates being already closed), as though they were wagons of the Parians, which after their arrival were parked near the gates from fear of the enemy. At a suitable moment they were to set fire to the wagons, so that the gates might catch fire, and when the citizens of Parium had gone to put out the flames he himself might enter at another point.

32.1 Against the approaches of the enemy you must take the following measures with engines or with infantry. In the first place, against objects raised higher than the wall . . . . . one must set smoking materials that will send up a great smudge from beneath, and must kindle those which will rouse as great a blaze as possible...

32.8-12 Furthermore, against the large engines on which many troops are moved up, and from which missiles are shot, and especially catapults and slings, and incendiary arrows against the thatched roofs - against all these, I say, those in the city must, in the first place, secretly dig beneath where the engine is to be applied, so that the wheels of the engines may sink and fall into the excavations. Then, on the inside, you must build a defence of baskets of sand and of stones from what you have nearby, which will overtop the engine and render the missiles of the enemy useless. At the same time you must spread out from the inside of the wall thick curtains or sails as a protection from the oncoming shafts, which will stop the missiles that fall over the wall, so that they will be easy to gather up and none will fall to the ground. The same must be done at any other

part of the wall where the missiles might come over and injure or wound the helpers and passers-by. And at whatever part of the wall by bringing up a pent-house a portion of the wall can be dug through or broken down, there counter-preparation must be made. To forestall the piercing of the wall a large fire should be built, and to provide against a breach of the wall a trench must be dug inside, so that the enemy may not enter. At the same time you should build a counter-rampart where the breach is being made, before the wall collapses, if you cannot otherwise stop the enemy.

33.1-4 You must pour pitch and cast tow and sulphur on the pent-houses that have been brought up, and then a fagot fastened to a cord must be let down in flames upon the pent-house. And such things as these, held out from the walls, are hurled at the engines as they are being moved up, by which the latter are to be set on fire. Let sticks be prepared shaped like pestles but much larger, and into the ends of each stick drive sharp irons, larger and smaller, and around the other parts of the stick, above and below, separately, place powerful combustibles. In appearance it should be like bolts of lightning as drawn by artists. Let this be dropped upon the engine as it is being pushed up, fashioned so as to stick into it, and so that the fire will last after the stick has been made fast. Then if there are any wooden towers, or if a part of the wall is of wood, covers of felt or raw hide must be provided to protect the parapet so that they cannot be ignited by the enemy. If the gate is set on fire you must bring up wood and throw it on to make as large a fire as possible, until a trench can be dug inside and a counter-defence be quickly built from the materials you have at hand, and if you have none, then by taking them from the nearest houses.

34.1-2 If the enemy tries to set anything on fire with a powerful incendiary equipment you must put out the fire with vinegar, for then it cannot easily be ignited again, or rather it should be smeared beforehand with birdlime [reading 'ὄξει'], for this does not catch fire. Those who put out the fire from places above it must have a protection for the face, so that they will be less molested when the flame darts toward them.

35. And fire itself which is to be powerful and quite inextinguishable is to be prepared as follows. Pitch, sulphur, tow, granulated frankincense, and pine sawdust in sacks you should ignite and bring up if you wish to set any of the enemy's works on fire.

37.1 & 3 Those who are constructing mines are to be prevented in the following manner. (3) But if you have no chance to build a stone wall you should bring up logs and rubbish . . . and if the mines at any point open into the moat, there you should dump the wood and set fire to the rubbish and cover the rest over in order that the smoke may penetrate the opening and injure those in the mine. It is even possible that many of these may be killed by the smoke.

We have already looked at most of these techniques in connection with the Vigiles, and have suggested that some of them were not applicable in Rome. It is striking that the understanding of fire which we find in the pages of Aeneas goes well beyond the mere 'tactics' of firefighting. The types of buildings which, he writes, may be fired in order to draw out the inhabitants - dockyard, gymnasium, temple - are precisely those which were difficult to treat on account of their combustible contents, materials and height: and the experience in the City of Rome was similar - witness the bad fires involving public buildings which were difficult to extinguish. Again, the use of fire such as he describes imply an ability to control it and the confidence that comes from experience. This experience the Romans inherited and developed, so that the Vigiles had plenty to build on. Moreover, aside from the question of techniques, the Romans sometimes exercised a strictness in fire matters which shows a determination to have fire recognised as a very powerful weapon, whether offensive or defensive. Thus the following punishments were meted out when fires had not been kept under control:

"When Aurelius' line of works was burned and his camp captured, Cotta had him scourged with rods and ordered him to be reduced to the ranks and to perform the tasks of a common soldier"

(Front.Strat.4.1.31)

"When fire had been set to his line of works by the enemy, Marcus Antonius decimated the soldiers of two cohorts of those who were on the works, and punished the centurions of each cohort. Besides this, he dismissed the commanding officer in disgrace, and ordered the rest of the legion to be put on barley rations."

(Front.Strat. 4.1.37)

Against this background, the operations of the Vigiles are seen to have been selective, choosing the techniques which would suit the conditions in Rome, and utilising those features of military firefighting and organisation which would be of real benefit. Even the night patrols of the tresviri nocturni were surely the fruit of military experience.

7.9.8.

To return more directly to the question of any influence that Alexandria might have had on the Vigiles, it is probable that in both Alexandria and Rome the problem was not one of producing a new technical solution to the problem of fire but of choosing a solution that would be acceptable and effective. The Greeks, like the Romans, had a background of military experience to draw on, and the principles of firefighting - speed and water - were known as well by them as by the Romans. But they did not possess a monopoly of knowledge about fire extinction, and the question whether the Romans were directly indebted to the Greeks in this respect has little relevance, probably, after the third century B.C., if not earlier. The scale of the Republican arrangements in Rome is not unlike that in the Greek cities. The one feature of the Vigiles which is distinctive is the sheer scale. No other city enjoyed such protection from trained and numerous firemen. For this, there was no civilian precedent; only the army could have provided inspiration for the basic type of organisation. The application of such an organisation to firefighting was the creation of Augustus himself, and it may be argued that only the imperial power could bring an organisation like the Vigiles into being. Thus we do not need to turn to Alexandria: Rome itself created the Vigiles.

7.10.1

In discussing the evidence for fire stations (6.1.2) it was noted that Augustus did not necessarily station the cohorts of Vigiles in the same places as their predecessors, and the castra and excubitoria were, when eventually provided, also situated according to needs and not according to mere precedent. Figure 26 shows the locations of the four castra and the one excubitorium which have been identified archaeologically. These identifications are consistent with the distribution of the cohortes Vigilum given in the Notitia Urbis, and it is possible without too much difficulty to determine which Region was paired with which Region so that each cohort could look after two Regions (Dig. 1.15.3).

7.10.2

The castra were distributed as follows:

Cohort I Region VII
Cohort II Region V
Cohort III Region VI
Cohort IV Region XII
Cohort V Region II
Cohort VI Region VIII
Cohort VII Region XIV

Region VII could only have been paired with Region IX, since the other adjoining Regions contained castra. Hence VI could only have gone with IV, and III with V. Until the fourth century Region XIV was not linked by bridge to Region XIII, so that these cannot have formed a pair and XIV must have gone with XI. Thus XII and XIII form a pair, I and II form a pair, and VIII and X form a pair.

7.10.3

There were 14 excubitoria (Notitia Urbis, Nordh 1949, 105), but the Notitia does not assign them to Regions, giving them simply in the summary. It is, therefore, a hypothetical possibility that there were 2 excubitoria in each of the Regions which lacked castra; but against this is the fact that the one identified excubitorium is in Region XIV, which is known to have had its own castra.

7.10.4

The fire stations were therefore distributed as follows:

Cohort	Regions with castra + excubitorium	with excubitorium
I	VII	IX
II	V	III
III	VI	IV
IV	XII	XIII
V	II	I
VI	VIII	X
VII	XIV	XI

This is shown in the diagram, Figure 26.

7.10.5

For the purposes of firefighting, two implications of this distribution are of interest: the number of stations, and their relation to the fire risks. Even in the absence of a detailed map of the fire risks it is possible to divine the thinking behind this distribution.

The number of castra (as opposed to non-residential stations) is basically related to the number of cohorts likely to be needed at any one time, both for patrols and for actual firefighting; the number of excubitoria is related to the needs of the patrols to supplement the castra in respect of first-aid firefighting equipment which was not carried by the patrols but which might be needed quickly. The location of both castra and excubitoria is a reflection of the distribution of fire risks.

7.10.6

It has been suggested that the patrols were based on the century and that the cohort was the basic unit for firefighting, other than first-aid (4.27, esp. 10). Now that we have produced estimates of the number of fires and 'interventions' (7.5.2) it is possible to see how the number of cohorts was determined. For an average of 20 largish fires per day, 2 of them being serious, it would have been necessary to plan the brigade so that it would be capable of fighting several fires simultaneously. In planning for reinforcements, it would also have been necessary to ensure that no area was left unprotected if a fire should break out there while the cohort was reinforcing elsewhere. The number of cohorts should therefore have been slightly greater than the number of large fires which might normally occur simultaneously. Normally no more than 2 of these fires might require reinforcements, though reinforcements might be needed if 2 largish fires which did not themselves require more than a cohort broke out in one Region or one pair of Regions. If the patrols did their job effectively, the likelihood of several fires becoming large at the same time was diminished, and the patrols were concentrated at night, the most dangerous time; for this reason, it was probably expected that there would not be a concentration of large fires within a very short period. These

considerations do not lead to a precise and definite number, but they do imply that one might reasonably have expected to plan for up to four largish fires at once (see 7.5.1-2). Given that sort of number, it is just a matter of administrative convenience that seven was the number of cohorts that was chosen to fit conveniently into the fourteen Regions.

There is one piece of evidence which confirms that this was the line of approach. According to Paulus (Dig. 1.15.2), Augustus set up the fire brigade "pluribus uno die incendiis exortis"; he must have had in mind not merely the needs of patrolling but also of firefighting on a largish scale. For patrolling, there was not a definite number of men and cohorts which would suffice: a greater number could always be used; but for firefighting it was possible to estimate in terms of manpower and the number of cohorts simply because the number and frequency of fires was already known.

7.10.7.

On the distribution of fire risks throughout the City, there is little to say other than that although there were variations in the uses to which the various areas were put - residential, warehousing, temples, other public buildings, open spaces - the effect on fire risks was to spread them fairly evenly. A season of storms might produce more lightning strikes on temples, a cold spell might produce more fires starting from portable heaters, or a festival might produce a number of fires from the careless use of torches: but all such specialities would add up to a fairly even spread throughout the year and throughout the City. Although each type of land use produced its own special problems, the fires, once

they broke out, all needed speedy treatment, and, no matter what type of premises a fire started in, the dangers if it got out of hand were equally bad. For this reason, it was sensible to spread the cohorts evenly through the Regions, with one Cohort for two Regions, and it may be surmised that the excubitoria were spaced fairly evenly between the castra and between adjacent excubitoria. This is also justifiable for ease of patrolling, and avoidance of undue walking.

7.10.8

All detailed messages must have been taken by runners or men on horseback (4.20). In the case of calls for reinforcements, it is probable that audible signals were used and that the reinforcements could turn out before a runner had arrived. There must have been a system for turning out to specified points, and there may well have been intermediate points between the fire stations where the men had to assemble to receive more detailed information. If we assume that trumpets and similar instruments were used, it is possible to estimate the shortest time needed for reinforcements to arrive. The well-known Captain Shaw, who was also notorious among firemen for his hard discipline and strict training, reckoned that runners could meet the following performance figures (Blackstone 1957, 157):

½ mile in just over 3 minutes

1 mile in 8 minutes

1½ miles in 15 minutes.

These refer to firemen in London, and they will have taken the quickest routes between points though these will have involved many corners and turns. The same sort of figures should have applied to Roman firemen,

though the reinforcements will have travelled a little more slowly than the runners. In travelling time, they mean that each castra was within about 8 minutes of the adjoining ones, that there will have been a castra or excubitorium within about 3 minutes, and that no more than about 10 minutes need have elapsed for the arrival of the 'home' cohort and 20 minutes for the arrival of a reinforcing cohort from a different castra. In the absence of motorised transport it is unlikely that cohorts or centuries were moved around in order to fill in gaps as other units went out to fires, and it would have been unusual to have more than about three cohorts at a single fire, as this would have left too big an area unprotected. There is no reason, however, why there should not have been up to 1,000 men at many of the large fires. The majority of these will have been engaged in bucket-chains and protecting buildings near to the one which was burning.

7.10.9

The most striking feature of the distribution of fire stations in ancient Rome is that the problem of distance was not a big one; Rome was small enough not to create travelling problems. Given, in addition, the large amount of manpower for firefighting, it becomes clear that the siting of fire stations was less critical then in later cities, where economies of money and manpower had to be exercised. Braidwood (1830,15f.) expressed a preference for the stations to be on tops of hills so that the firemen could arrive more quickly and with less effort at a fire, and we may add a further justification for the use of the top of a hill that it made fire-watching easier. It may not be an accident that three of the four identified castra in Rome were on higher ground (the exception being the castra of the First Cohort in Region VII), with the Fourth Cohort near

the top of the Little Aventine, the Fifth near the top of the Celian, and the Third near the top of a more gradual slope.

7.10.10

Before we leave the Regions, we may perhaps be permitted a brief digression, to consider the relationship between the seven areas into which the Vigiles divided Rome and the seven ecclesiastical regions which were established in the middle of the third century A.D.

We have seen that the fourteen civil regions of Augustus existed before the Vigiles. The number fourteen was probably connected with the distribution of the population and with administrative convenience. Seven, the number of cohorts of Vigiles, was probably the number nearest to the ideal number of firefighting units which would fit conveniently into the fourteen regions (7.10.6).

Later, traditionally in the middle of the third century, the Church established the seven ecclesiastical regions which were later to provide the sole administrative framework for the City. The relation between the fourteen civil regions and the seven ecclesiastical regions has been much debated, and still needs considerable clarification. The basic discussion is that of De Rossi (1877, 514-518), though for his broader conclusions we have to turn to his Piante (1879,78f). Here he states:

> "Le regioni ecclesiastiche non corrispondevano coi limiti delle regioni civili. Ho cercato se alcuna attinenza avessero colla distribuzione settenaria delle coorti dei vigili: né anche con questa conviene la divisione settemplice della primitiva Roma cristiana."

This is despite the fact that he produced the following approximate equations in his earlier study:

Regions

Ecclesiastical	Civil
I	XII, XIII
II	II, VIII
III	III, V
IV	IV, VI
V	VII, part of IX
VI	most of IX
VII	XIV

It is clear that the civil regions in these equations are more or less grouped in the pairs which the Vigiles used. We can improve on De Rossi, and assign civil regions I and X to ecclesiastical region II, since they intervene between civil regions II and VIII. This means that ecclesiastical region II consisted simply of two of the Vigiles' pairs of regions. Civil region XIV became an ecclesiastical region on its own, and XI had to be redistributed; Testini (1958, 157)puts it into ecclesiastical region II. The reason why civil region IX formed one ecclesiastical region on its own may be the increase in population under the Empire in the Campus Martius (Platner-Ashby 1929, 93, s.v. Campus Martius).

The differences in the divisions of Rome for the Vigiles and for the Church may reflect changes in the distribution of the population over the three centuries separating them. What is interesting is that there is any correspondence at all. As early as the seventeenth century the hope had been expressed by Leibnitz that the seven divisions of Rome of the Vigiles might be able to throw light on the ecclesiastical regions

(Fabretti 1699, 265f). Probably they throw mutual light on each other. There were already seven deacons in Rome in the middle of the third century (Eusebius H.E. 6.43.11) and there were to be seven ecclesiastical regions. According to the Liber Pontificalis (Duchesne 1886, p.148: XXI FABIANUS, A.D. 236-250), Fabianus "regiones dividit diaconibus et fecit VII subdiaconos qui VII notariis inminerent". In his note on this passage, Duchesne followed De Rossi in supposing that this division into seven did not correspond with that of the Vigiles, and his commentary at this point is thus not clear. The natural sense is that Fabianus distributed the already-existing civil regions among the deacons to make the ecclesiastical regions. Beyond this point we enter the region of speculation. Possibly the Church and the Vigiles had both to suit their divisions to the distribution of population, and so produced similar results. Possibly the arrangements for the Vigiles gave rise to similar arrangements for other branches of the civil administration, and the Church did no more than follow the existing civil arrangements. Possibly something of both was involved: we need not follow Vielliard (1959, p.54 n.2) in assuming that these must be alternatives. The precise details are not clear; but more than mere chance coincidence is involved.

7.11.1

We come now to the most important material resource which Rome offered for firefighting: water. As Braidwood observed (1866, 149):

> "The supply of water is the most vital part of any exertions towards extinguishing fire."

The majority of fires - ancient and modern - can be put out with water, and because of its cooling effect water remains, even today, far ahead of any possible alternatives.

7.11.2

Our knowledge of the water supply of ancient Rome is limited by the fact that the only ancient data concerning the quantities carried by the various aqueducts, given by Frontinus, is in terms of quinariae. The quinaria was in fact a measure of cross-section (applied both to the aqueducts themselves and to the distribution pipes), whereas the minimum additional piece of information which we need is the velocity of the water. For the purposes of this study of the Vigiles, we do not need to know the precise amount of water which was brought into Rome. Our method will be to work out an underestimate of the quantity, so that we can be fairly sure that the Vigiles will not have had to face a worse situation. This will then help to indicate their minimum possible effectiveness, while creating confidence that for most of the time they could have been rather more effective.

7.11.3

The best estimates for the input of water into Rome are those given by Ashby (1935, 30ff). These are based on Di Fenizio's calculation that 1 quinaria = 0.48 litres per second (41.5 cubic metres per 24 hours), and by a small amount of comparative data Ashby shows that this equation gives the right sort of result. Herschel (1899), himself a water engineer, emphasised that the quinaria could actually cover a wide range of values when all the factors governing the quantities of water were taken into account, and suggested that the best value for the quinaria was 5,000 - 6,000 U.S. gallons per hour $\pm$ 2,000 - 3,000 (pp.212f.) This estimate, which is about half that used by Ashby, was based on Blumenstihl's readings (of about 1869) for the springs which supplied three of the aqueducts (Marcia, Virgo, and Claudia), divided by the

numbers of quinariae given by Frontinus. Allowance is made in the calculations which follow for the lower readings used by Herschel.

7.11.4

When the Vigiles were established, in A.D.6, water was being delivered to Rome as follows (the first three columns are taken from Ashby, and the fourth column expresses the data in a form which can be compared with relevant modern data).

Aqua	Quinariae	Gall./sec.	Gall/minute
Appia	1,825	193	11,580
Anio Vetus	4,398	464	27,840
Marcia	4,690	495	29,700
Tepula *	445	47	2,820
Iulia	1,206	127	7,620
Virgo	2,504	264	15,840

* The aqua Iulia tapped the springs of the aqua Tepula. By the time that Frontinus was writing, the Tepula was fed entirely from other aqueducts (Frontinus Aqu.68), and to produce an underestimate for the preceding period it has been ignored in the calculations. The data (from Ashby, p.30 n.3) have been included here just to show that the Tepula was only a small supply.

By the end of the reign of Nero the following had been added:

Aqua	Quinariae	Gall./sec	Gall./min
Claudia	4,607	486	29,160
Anio Novus	4,738	500	30,000

The supply was further increased in 109 and 226 by the addition of the aquae Traiana and Alexandriana. There are no surviving ancient figures for these (both of them post-dating Frontinus), but Ashby suggests that the two Papal aqueducts which in a sense are their equivalents - one by virtue of tapping the same springs, the other by following the same course very closely - may give some indication of their deliveries. The figures are respectively:

Acqua Paola (aqua Traiana) 118,127 cubic metres per 24 hours
Acqua Felice (aqua Alexandriana) 21,633 cubic metres per 24 hours

These correspond to 18,227 and 3,330 gall./minute respectively: the latter appears too small to be a plausible estimate for the aqua Alexandrina, and indeed it does have a rather large channel for so small a quantity of water (Ashby p.30).

All the supplies so far mentioned were suitable for drinking. In addition, there was the aqua Alsietina, constructed in 2 B.C. to feed the Naumachia. This was kept separate from the other supplies on account of its unwholesomeness, and probably was not distributed generally even in emergencies. It is ignored in this study, having been very small: 392 quinariae, 41 gall./sec., or 2,460 gall./minute.

The following figures, based on the above calculations, show how much water was being delivered into Rome at the periods mentioned:

Before A.D.6	92,580 g.p.m.
End of Nero's reign	151,740 g.p.m.
After 109	169,967 g.p.m.
After 226	173,297 g.p.m.

7.11.5

In order to see the Vigiles in the worst possible situation they are ever likely to have encountered, let us now modify Ashby's figures. First, in view of Herschel's estimate (which is based on actual readings), let us halve the quantities indicated by Ashby. Secondly, piling disaster on disaster, let us assume that owing to leaks, repairs, etc., only half that amount of water was reaching the City. Thirdly, just to ensure that our underestimate really is an underestimate, let us further halve the quantity available to the Vigiles, in case they only had access to this proportion of the water because some went straight to premises without being easily tapped. We have, therefore, to divide Ashby's totals by 8. This gives, along with the reasonable estimates, the following underestimates:

Before A.D.6.	11,573 g.p.m.
End of Nero's reign	18,968 g.p.m.
After 109	21,246 g.p.m.
After 226	21,662 g.p.m.

These allow for the 29% of the total number of quinariae which were delivered outside the City itself (Frontinus Aqu. 78), the actual quantity represented not being even approximately capable of determination.

7.11.6

For firefighting, these estimates and underestimates (even the smallest)show that there was more than enough water available from the aqueducts. The significance of these figures is brought out clearly if we consider what they imply in terms of modern firefighting. A modern fire pump, such as is fitted to many modern fire engines, has a capacity of 500 g.p.m. Our worst estimate for the earliest period, 11,573 g.p.m., implies a quantity sufficient to supply 23 modern fire pumps. This rose to (at least) 43. Taking Ashby's estimates as more reasonable, the number

of pumps which could have been supplied started at 185, and rose to 346. In many cities today just one of these pumps is adequate or more than adequate for the majority of fires; and only rarely does one need more than 6. Except, therefore, for the very largest conflagrations, such as might have taxed the resources of any city at any time, including the present day, the City of Rome had more than enough water available from artificial sources for firefighting, and could even have supplied enough water for several medium or large fires. The Tiber might have made the total quantities twice as big. It is therefore clear that the quantity of water was not a limitation on firefighting at all. Indeed, as we shall see, the Vigiles are almost unique in having more water available than they could have possibly used. As Morris (1939, 128) commented, "A fireman's usual grouse is that he hasn't enough water".

7.11.7

But more than mere quantity of water is needed: it has to be available at the fire. Since the seventeenth century hoses have been in common use, both for relaying water over long distances and for directing water from the pump to near the fire itself. The Romans did not possess hoses (4.8). Nor were there any fire hydrants or special fire mains, contrary to a common modern opinion (e.g. BR p.39). The two pieces of evidence cited to support this opinion are, first, the lead pipes bearing the stamps of cohortes vigilum (BR p.90), and secondly, the brief report of a lawsuit recorded on VI.266. But these lead pipes are nothing other than a normal water supply marked with the name of the destination (i.e. a fire station, in this case); while the lawsuit, whatever the precise significance (see 7.7.8), did not concern a special water supply for firefighting. There was no distribution of water

other than the distribution among the normal uses.

7.11.8

In cities where the water supply is under pressure it is sometimes possible to take a jet of water straight from the mains. The height which water from a burst main can reach is some indication of the energy involved. The supply in Rome, however, was not at a high pressure; in fact, every effort was made to avoid high pressures (Ashby 35-37). In the absence of hoses, moreover, even the head pressure of the aqueducts could not be directly utilised. Even a method of distributing water which was used in many English towns - letting water run along the streets to wherever it was required and digging holes to make temporary reservoirs - could not have been used in Rome owing to the presence of the many ducts below the pavements; for these would have collected and diverted the water. There was thus no alternative for the Vigiles but to carry water to where it was needed.

7.11.9

We can now see how these limitations of distribution affected the actual firefighting. If we imagine the Vigiles equipped with modern pumps capable of pumping 500 g.p.m. but without hoses, we can make a rough estimate of the manpower required to keep one of these pumps supplied. Over a longish period men in a bucket chain could probably keep water passing at about 40 g.p.m., with each man covering about 2 metres. In order to deliver 500 g.p.m., therefore, there will need to be about 12 separate bucket chains. Thus, over a distance of 2 metres between the source of the water and the pump, 12 men will be needed; over 10 metres, 60 men will be needed; over 100 metres, 600 men will be needed; and to relay water over 1 kilometer, 6,000 men will be needed. All this is just for one modern pump. Turning the figures round, one cohort of 500 men could

keep up with this pump over a distance of about 42 metres. The value of this comparison is to emphasise the value of hoses. For our study of the Vigiles there are two very important implications: that, as with other equipment, what the Vigiles lacked in hoses, they had to make up for in men; and that as far as possible they will have had to use sources of water which were available very close to their fires. Obviously, the maximum possible capacity of their pumps was partly limited by these problems of distribution.

7.11.10

Frontinus gives the number of castella served by each of the aqueducts and gives the Regions which each aqueduct supplied; he does not, however, tell us how many castella were situated in each Region, nor how many quinariae went to each Region. Lanciani (1880, 577-580) attempted various tables to show how the water was distributed both physically around Rome and also per capita of the population; but Lanciani has to use too many unknown factors, and in addition there are textual difficulties over some of Frontinus' numbers. We can avoid some of the difficulties if we work with averages, for the area served by each castellum and the quantity of water supplied by each castellum. It is probable that the number of castella increased proportionately with the capacity of the aqueducts, and that we shall not be far out if we assume, for our estimates, that a castellum in the time of Augustus had the same capacity as one under Trajan. Frontinus tells us that (in his own time) there were altogether 247 castella within the City (Aqu.78); from the totals estimated above (7.11.4) we can determine the average quantity for each castellum. We have to divide the 151,740 g.p.m. (the total input just before 109, the period to which Frontinus refers) among 247 castella. This gives 614 g.p.m. for the reasonable estimate. For our worst estimate, the quantity is one eighth of this, i.e. 77 g.p.m.

7.11.11

In estimating the area served by each castellum we have to make two assumptions. First, we have to use a figure to represent the area of the City; and, since we do not know precisely the limits of the inhabited area at any period, we shall use an exaggerated estimate: a square of 6,000 metres, which should enclose the City at any period. Secondly, we shall have to assume that the water was distributed as evenly as the table below suggests. This table is based on Frontinus, but avoids the textual difficulties by not using precise figures, simply indicating with a cross the Regions served by each aqueduct.

Aqua	Region														No. of Regions
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Appia		x						x	x		x	x	x	x	7
Anio Vetus	x		x	x	x	x	x	x	x					x	9
Marcia	x		x	x	x	x	x	x	x	x				x	10
Tepula				x	x	x	x								4
Iulia		x	x		x	x		x		x		x			7
Virgo							x		x					x	3
Alsietina														(x)	(1)
Claudia	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
Anio Novus	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
No. of aqueducts per Region	4	4	5	5	6	6	6	6	6	4	3	4	3	6(7)	68(69)

The Alsietina was never distributed; the Anio Vetus, though kept separate from the other supplies, was distributed. This table shows that no Region was badly served though there might appear to have been a slight concentration towards the centre of the City. Also, as Lanciani noted (1880,578), the

isolated hills such as the Celio and the Aventine were served by fewer aqueducts, and there were also occasional pockets with inadequate supplies (and cf. Martial 9.18.5f). It is possible that the outer areas of the City were less well served than the inner, and this would imply that the areas of predominantly public and daytime resort were better served than the outskirts. In the estimates which we are making of the availability of water, it is hoped that by taking an exaggerated figure for the area of the City we shall obtain a minimum average for each castellum, which would be bettered at the least in the central areas and possibly also in the outskirts. Assuming, then, that the square of 6,000 metres is to be divided among 247 castella, on average each castellum should serve approximately 145,300 square metres, equivalent roughly to a square of side 380 metres. This average implies that there would be a castellum available within about 190 metres to 270 metres.

7.11.12

The frequency of the distribution of the castella has been selected because we can make an estimate of the quantity available from them. It is true, however, that very often there will have been other points much nearer to a fire than the castella, such as public fountains, baths, sometimes even private supplies, for example, to which the Vigiles will have had ready access. But, like the Vigiles themselves, we must confine our basic deductions about the availability of water to what is reasonably certain and reliable, and work out a procedure which would be applicable to the majority of fires, though with the obvious provision that the basic procedure should be improved on in individual cases.

In our estimates, then, we find that the Vigiles could reasonably have expected to find a minimum quantity of water of about 77 g.p.m. within about 270 metres, and in optimum conditions, about 614 g.p.m. within 190 metres. These figures are significant, because they can be related to firefighting needs. They help to indicate some of the basic principles upon which the Vigiles operated and the reasons for the use of these principles.

7.11.13

In order to deliver our lowest estimate of 77 g.p.m., about 2 men will be required for every 2 metres, and over 190 metres this would require about 190 men. Until A.D. 205 this would have been equivalent to more than one century, and leaves out of account the men needed to perform duties at the actual fire, in the return bucket-chain, and distributing water between however many pumps were in use. Although it would be possible to produce further estimates, the point should be clear that lack of hoses was a major limiting factor, which could only to some extent be overcome by the use of large numbers of men, summoned as reinforcements. Since the pumps that survive are unlikely to have delivered more than 5 g.p.m. (4.6.10), one bucket chain could have supplied up to 16 such pumps, and correspondingly fewer if larger ones were used. Allowing for the return bucket chain and the men distributing the water, about 360 men could have been required to deliver our lowest estimate from our minimum estimated distance. It is clear that the Tiber would have been too distant from the majority of fires to be of any use. These estimates, however imprecise, highlight the problem: the Vigiles had to find a balance between the quantity of water which might be needed, and the quantity of water which was reliably available.

7.11.14

They found a twofold solution, the patrols. First, these actively sought out fires, to catch them while they were still small and capable of extinction with only small quantities of water. Secondly, the patrols were equipped with portable first-aid equipment, especially axes and buckets. The potential value of such a system cannot be exaggerated, yet the scale on which the Romans implemented it is unique. The patrols which were used under the Republic can only have been on a small scale, and possibly some of the German city brigades came nearest to the scale of operations of the Roman patrols (these, it is interesting to note, were military brigades). The nearest true analogy with the Vigiles' system is the modern sprinkler system, in which, entirely automatically and independently of people, sensors detect a fire and direct water onto it while is is still small. The reductions in insurance premiums for premises equipped with sprinklers are ample proof of their effectiveness.

7.11.15

The patrols should not, however, be regarded as substitutes for a better system. They utilised two important resources which were available in the City of Rome, ample manpower and the water supply. Neither of these owed its existence to the needs of firefighting, and their use for firefighting did not deplete the resources of the City. In this sense, the economic cost of the Vigiles was negligible and the gains were positive. The cost of equipping the Vigiles with hoses (an anachronistic modern notion) would have been great, and if it had involved a diminution of the patrol cover the effect on firefighting would have been bad. Moreover, it is worth emphasising, large numbers of men would still have been needed even if there had been hoses: for a certain amount of human energy is needed to convey any given quantity of water over any given distance, whether hoses are used, or buckets. What distinguishes the Roman system is the patrol system, and it is to their credit that they made this use of their resources.

7.11.16

It will be clear that our more realistic average for the quantity of water available at each *castellum*, 614 g.p.m., implies that much of the water could not be got onto a fire even if it was very close. For most fires, it will have been best for the *Vigiles* to take water from the nearest available points, and in well-run houses there will also have been emergency supplies of water as required by law (Tac *Ann* 15.43; cf. *Dig* 33.7.12.18). In this way, speed will have removed the need for large quantities of water. But for large fires, particulary those requiring the use of many pumps, it will have been necessary for all the water to have been taken direct from the *castella*. This is because a depletion of the water at the *castellum* will have reduced supplies all down the line, so that after a certain point drinking fountains and the like will have dried up. A similar problem arises with the modern mains, though in that case what would happen is that by drawing water from a hydrant pumps could suck the whole system empty, so that precautions have to be taken. For the Romans, the problem would arise when a fire had reached an advanced stage, and it would suddenly increase the need for manpower. This again provided an incentive for them to extinguish fires before they became large.

7.11.17

Not merely was there this incentive to keep the fires below the level at which pumps were required: it was also an incentive to keep the pumps themselves fairly small. Considerations of manpower will have restricted the size of pumps to what could reasonably be expected to be supplied with water. Given the deduction that the nearest supplies of

water will have been used as much as possible, and observing that the quantities at each of these will have been considerably less than those available from the castella, the pumps cannot normally have been much bigger than those operated in more recent times by a pumping team of 4 men. Our study of fire pumps (4.6.10) showed that the largest size for the Roman pumps deducible from literary and archaeological evidence is that which we called "medium", a conclusion which finds striking confirmation in our study of the water supply. Clearly the capacity of the pumps matched the combined capacity of the water supply, and of the manpower.

7.11.18

The value of this discussion has been to emphasise the value of the patrols. The conclusion remains valid even if we greatly alter some of the variables. It is doubtful whether the Vigiles could have used as much water as was often available, particularly as the supply was increased from time to time, and this frustration must be one peculiar to the fire brigade of the City of Rome.

7.11.19

Later brigades used large numbers of men as pumpers, but these were normally casual labourers. The Vigiles actually kept all their equivalent of pumpers - the man who formed the bucket chains - on the books. The reason for this difference is that the Vigiles needed large numbers of men for patrols in order - paradoxically - to avoid the need to use large quantities of water. It was really a failure of the system if these men needed to form bucket chains on a large scale. This unique circumstance is explicable because water was available from a large number of points, and the patrols made it possible to extinguish the

majority of fires using small-scale, first-aid equipment. Without the water supply such as Rome provided, the chief justification for the mode of operation of the Vigiles would not have existed. Nor, probably, would the Vigiles.

CHAPTER 8

ASSESSMENT

8.1.1

The only hypothesis which unites all the evidence relating to the Vigiles is that they were a fire brigade. Any other functions were incidental. The evidence shows us how they operated, and the scale of their patrols makes the Vigiles a unique fire brigade.

8.1.2

Anyone accustomed to modern fire brigades would have found the Vigiles strange, and often inconvenient. A passing patrol could interrupt one's domestic activities if they suspected there was a fire or, even, merely the risk of a fire. During the day, it was assumed that anyone could see if a fire was starting and put it out. At night, the Vigiles would tend to arrive without being summoned, while the occupants of the burning premises were asleep or absent. At a fire, you could very rapidly have at least eighty men in attendance, and the number could rise very soon to five hundred or a thousand. The Vigiles would have attended many of the fires to which a modern brigade would not be summoned. Only a small proportion of their firefighting was originated by a call for help.

Methods of extinction were basic but effective. Speed and water were the basic principles, and the combination of the patrols with the distribution of large quantities of water throughout the

City meant that the Vigiles could operate without the advantage of modern pumps and hoses. More than any other fire brigade, the Vigiles used ample manpower to compensate for the simplicity of the equipment. By catching fires while they were small, the need for elaborate rescue equipment was avoided.

8.1.3

The prefect and the sub-prefect stand slightly apart from the main activities of the Vigiles. Although the prefect was responsible for the overall operations of the corps, he had other functions which must have occupied a major part of his time. The jurisdictions given to the prefect meant that he had to spend much of his time in court. Only the major fires could have demanded his attendance in person. The sub-prefect must have done much of the top-level administrative work of the corps.

It follows that the functions of the prefect and of the corps do not coincide completely. The notion that the list of the prefect's jurisdictions is also a list of the interests of the corps has bedevilled study of the Vigiles, and it is without foundation. It was only when the prefect was acting as the chief fire officer that their respective functions coincided. The Vigiles were not a police force.

8.2.1

The fire which destroyed much of Rome in A.D.64 has often been taken as proof that the Vigiles were ineffective. But although something did go wrong on that occasion, reasonable estimates suggest

that this was just one fire in at least eleven million. Indeed, when we compare imperial Rome with medieval cities, it seems surprising that Rome did not suffer several such fires.

8.2.2

Given that in a city the size of Rome there were around 3,500 men on patrol at night, and that this number was increased to 7,000, it is difficult to see how the Vigiles could have been ineffective. Where it was appropriate, the Vigiles operated in a military manner, and with such numbers of men even the most minimal attempt to avoid chaos must have ensured effective cover.

8.2.3

A further pointer to the success of the Vigiles is that they were judged to be worth continuing when Augustus established the corps on an experimental basis, and that they continued for at least three hundred years. In a world which placed extensive restrictions on fire brigades, the Vigiles were unique. It is possible that the Vigiles themselves, or some of their prefects, reinforced the knowledge that fire brigades and other organisations could be seditious, but if this is the case it simply emphasises that they were felt to be useful.

8.2.4

The loss of around 8% of the men each year for reasons other than normal mortality is a testament to the rigour of the duties, and provides a further indication that the Vigiles operated efficiently. The firemen in Rome had to work hard all the time they were out on duty, and when they were in the fire stations they were either asleep

or standing by as reinforcements. This is in sharp contrast with the common complaint of the nineteenth-century fireman, that even when nothing was happening he was confined to the fire station.

8.3.1

The most important factor governing the day-to-day efficiency of the Vigiles must have been the quality of the individual officers and men. In the absence of direct evidence, the most we can say is that the higher we estimate the effectiveness of the Vigiles the better must the quality of the men have been.

8.3.2

The system provided opportunities for individuals to develop their abilities, and there was no barrier to prevent a technician or nco. from serving for many years. Centurions could also spend many years in the Vigiles. There was not a great deal of scope for promotion as a specialist fireman, and if a man was good in a particular post he would tend to stay there. The ordinary rankers had to work hard during their six years of service, and most of them left at the end of six years. A few stayed on; we do not know what distinguished these men. The tribunes and centurions could have had experience of firefighting in their military service prior to joining the Vigiles; but they must have relied heavily on the nco's, particularly the optiones, and on the technicians.

8.3.3

The material resource which enabled the Vigiles to function at all was the water supply. The aqueducts brought into Rome more water than the Vigiles could use, and more than a modern brigade would

require at most fires. The distribution system made the water available for any fire. Without it, the patrols would have been largely useless.

8.3.4

The availability of large numbers of men was also a prerequisite. Without the resources of later technology, manpower was needed by way of compensation. The normal period of six years of service meant that the men could be worked hard and replaced regularly.

8.3.5

Despite the short period of service, the Vigiles were organised as military units, and the officers were more soldiers than firemen. What distinguishes the Vigiles from other fire brigadds in the classical world is that only they were organised in this way, and the difference is one of numbers. The Republican arrangements for firefighting were typical of the hellenistic period: a small band of men directed by a city official. The imperial arrangements in Rome imported the large-scale application of a military technique, the patrol.

8.4.1

It would be easy to assume that Augustus and the Vigiles were highly sophisticated in fire matters. We can see which arrangements could have assisted their firefighting, even if this result was merely incidental to the Roman intention or even unforeseen by the Romans. Firefighting prowess would have been an advantage to those seeking promotion, but it did not automatically bring promotion. The centurions and tribunes would have been more useful with firefighting experience than without, but many other things would have had to be equal before such experience became crucial in selecting men to enter or stay in the Vigiles.

8.4.2

The ancient understanding of fire was basic but not extensive. The only extensive accounts of how to tackle fires were probably military manuals, such as that of Aeneas Tacticus. There was nothing like the modern knowledge of the physics and chemistry of combustion. However, the value of speed and water was well-known to the Greeks and Romans. For reasons connected with the nature of fire, speed and water are still the chief weapons against fire.

8.4.3

When Augustus was faced with the problem of several fires occurring at one time, he could see that there was water distributed around the City. In fact, one of the schemes of the Catilinarian conspirators had been to cut the aqueducts in order to hinder the firefighting when they set fire to Rome (Plut.Cic.xviii.2):

"ἄλλοι δὲ τοὺς ὀχετοὺς ἔμελλον ἐμφραξάντες ἀποσφάττειν τοὺς ὑδρευομένους"

The aqueducts were a resource which was under-used. His solution was to add manpower on a huge scale, to add the element of speed to the water. The result was a fire brigade which was unique and effective. It would not have fitted into modern conditions. But, like the larger brigades of the eighteenth and nineteenth centuries, it was capable of extinguishing any fire if it was caught early enough; and because of the patrols it was more capable than the later brigades of reaching a fire while it was small.

8.5.1

Our answer to the question whether we would have welcomed the Vigiles if our house had been on fire is "Yes".

APPENDIX I

EXTINGUISHING FIRE

[The chapter bearing this title in the Manual (Part 1, Chapter 2) is here reproduced in its entirety. It provides a good, concise account of the principles of fire extinction, applicable to the problems of any fire brigade.]

In the previous chapter [Manual 1, Chapter 1], the chemical reactions which produce fire were described from the scientific viewpoint. It is now proposed to relate this knowledge to the subject of fire extinction, and to refer to the various methods at present employed.

It has been shown that three factors are essential to combustion, namely:
(a) The presence of a fuel, or combustible substance.
(b) The presence of oxygen (usually as air) or other supporter of combustion.
(c) The attainment and maintenance of a certain minimum temperature.

Fire extinction, in principle, consists in the limitation of one or more of these factors, and methods of fire extinction may therefore be conveniently classified under the following headings:
1. Starvation, or the limitation of fuel.
2. Smothering, or the limitation of oxygen.
3. Cooling, or the limitation of temperature.

In practice, specific methods of fire extinction often embody more than one of these principles, but it will be convenient to consider them according to the main principle involved.

1. STARVATION

This method is applied in three ways:
(a) By removing combustible material from the neighbourhood of the fire. Examples of this are, the drainage of burning oil tanks; the working out of cargo at a ship fire; the demolition of buildings to create a fire stop; the cutting of trenches in peat, heath and forest fires; counter-burning in forest fires, etc.
(b) By removing the fire from the neighbourhood of combustible material, as, for instance, pulling apart a burning haystack or a thatched roof.
(c) By subdividing the burning material, when the smaller fires produced may be left to burn out or to be extinguished easily by other means. A typical example is the emulsification of the surface of burning oil, whilst the beating of a heath fire owes much of its effectiveness to this.

2. SMOTHERING

(a) By Reducing the Oxygen Content

If the oxygen content of the atmosphere in the immediate neighbourhood of burning material can be sufficiently reduced, combustion will cease. The general procedure in methods of this type is to prevent or impede the

access of fresh air to the seat of the fire, and allow the combustion to reduce the oxygen content in the confined atmosphere until it extinguishes itself. This principle is, of course, ineffective where, as in the case of celluloid, the burning material contains within itself, in a chemically combined form, the oxygen it requires for combustion.

The principle of smothering is employed on a small scale in snuffing a candle, and, on a large scale, in capping a burning oil well; two processes which are precisely analogous. The battening down of a ship's hold when a fire breaks out below decks will often hold the flames in check until port is reached.

Small fires, such as those involving a person's clothing, can be smothered with a rug, blanket, etc., while the use of sand or earth on small fires is a further instance of the same principle.

An important practical application of the smothering method is the use of foam. This forms over the burning material a viscous coating which, in so far as it is complete, limits the supply of air and also tends to prevent the formation of inflammable vapour.

Another method of smothering is by the application of a cloud of finely divided particles of dry powder, usually sodium bicarbonate, from a pressurised extinguisher. Research has been undertaken into this method and it is not certain that the action is solely related to smothering. Carbonates will absorb heat and when they are finely divided, as is the powder, their specific heat is very much greater. It may, therefore, be more accurate to say that the powder has a cooling effect in addition to its smothering effect.

A recent development in the smothering method has been the discovery of a powdered compound for use on metal fires, e.g. uranium, plutonium, sodium, potassium, thorium and magnesium. This powder, ternary eutectic chloride, is applied by means of a gas cartridge pressurised extinguisher. As the fusing temperature of the powder is in the region of 1076°F. (580°C.) it is intended that it shall form a crust over the burning metal and thus exclude the oxygen in the air.

Another class of smothering agent may be described as temporary in its blanketing effect. Thus the vigorous discharge of an inert gas or vapour in the immediate vicinity of the fire may so reduce the oxygen content of the atmosphere for the time being that combustion cannot be maintained. Carbon dioxide and chlorobromomethane are familiar examples of this. With fires of any magnitude, however, the convection currents set up are sufficiently powerful to dissipate the inert atmosphere formed by the application of a gas blanket before the extinguishing action can take effect. The application of certain of these media in the form of a liquid which is then vaporised by the fire, thus forming the required inert atmosphere, is more likely to prove effective, particularly as a cooling effect is also operative. (See Section 3, "Cooling")

(b) By Excess of Oxygen

The methods of fire extinction so far mentioned in the present section depend on reducing the oxygen content of the supporting atmosphere until the upper limit of combustion is exceeded. It is possible in certain cases to employ the reverse process, that is to pass so much air

across the burning material that the lower limit of combustion is traversed and burning ceases through a local deficiency of fuel (or excess of oxygen). It is well known that a certain draught is essential to rapid combustion, but when the most suitable rate of air supply is exceeded combustion is impeded, and, in the limit, totally inhibited. Thus, while a gentle application of the bellows to a coal fire will facilitate burning, the application of the same draught to a candle will extinguish it. It is by the application of this principle that oil well fires are extinguished by the blast from exploding dynamite. Such techniques do, of course, also involve to a considerable extent the cooling principle treated in the next section.

3. COOLING

If the rate at which heat is generated by combustion is less than the rate at which it is dissipated through various agencies, the combustion cannot persist. In applying this principle to fire extinction the first step is to accelerate the speed with which heat is removed from the fire, thus reducing the temperature of the burning mass and as a consequence the rate at which heat is produced. In due course the rate at which heat is lost from the fire exceeds the rate of heat production and the fire dies away.

The application of a jet or spray of water to a fire is invariably based on this simple but fundamental principle. There are many variations: another example is the emulsification of the surface of oil by means of the emulsifying type of sprinkler head producing an oil-in-water or water-in-oil emulsion. Another method of cooling which has been adopted for oil tanks employs the air agitation principle. In this air is introduced at the bottom of a tank and the bubbles of cold air, rising through the oil, carry cool oil from the bottom of the tank up to the heated layer at the top. The production of inflammable vapour is thus decreased until the point is reached where the fire dies out through lack of fuel.

The cooling principle in fire extinction is the one most commonly employed, forming as it does the basis of the application of water and other liquids to burning materials. The extinguishing medium operates by absorbing heat from the fire, as a consequence of which it may undergo one or more of the following changes:

(a) Its temperature is raised;
(b) It is converted to the vapour state;
(c) It is decomposed;
(d) It reacts chemically with the burning material.

It is clearly desirable that the quantity of heat required to produce any or all of these changes in a given quantity of an extinguishing medium should be as high as possible. That is to say, referring specifically to the above headings, that the following values should be as high as possible:

(i) The amount of heat absorbed for any given increase in temperature (the thermal capacity).
(ii) The amount of heat required to vaporise a unit weight of the extinguishing medium (the latent heat of vaporisation).
(iii) The amount of heat required to cause the decomposition of a unit weight of the extinguishing medium (the heat of decomposition).
(iv) The amount of heat required to cause a unit weight of the extinguishing medium to react chemically with the burning material (the heat of reaction).

The action of water depends predominantly on (i) and (ii), the latter being by far the more important. Thus it takes about six times as much heat to convert a certain amount of water at its boiling point into steam as is required to raise the temperature of the same amount of water from the usual atmospheric value to its boiling point. In the interest of efficiency, then, it is clearly desirable that water should be applied to a fire in the liquid condition and in such a way that as much as possible is converted into steam. The smothering effect of the steam produced at the seat of fire is thought to play a part in assisting the extinguishing process. In all firefighting operations where water is in use it should be the aim to ensure that the proportion of water which escapes from the building in liquid form to that which is applied should be as low as possible. When the heat of a fire is considerable, as in its early stages, the steam formed will not be visible, but as the temperature falls the steam will condense above the fire. This is widely recognised by experienced fire officers as a sign that a fire is being brought under control.

On a basis of thermal capacity and latent heat of vaporisation, water is an excellent fire extinguisher, since both figures are high. This fact, combined with its availability in large quantity, makes it by far the most useful fire extinguisher for general purposes. The principle of decomposition probably has little application, as water is fairly stable except at very high temperatures. Certain substances (e.g., carbonates) absorb heat in this way (see the reference to dry powder extinguishers under Section 2, "Smothering"). Water is not usually effective in absorbing much heat by reacting with the burning substance. Some extinguishing media may in certain circumstances prove dangerous in this connection, their reaction with the burning substance resulting in the evolution rather than the absorption of heat. Moreover, the reaction may result in the production of a substance which is itself combustible, thus adding fuel to the fire. The action of water on burning magnesium exemplifies both these effects, since it reacts with the metal exothermically (i.e., producing heat) with the formation of hydrogen, which is readily ignited. In the case of other media the reaction products may be undesirable in other senses, as in the case of carbon tetrachloride, which under certain conditions may evolve phosgene, a highly poisonous gas.

APPENDIX II

THE END OF THE VIGILES

It is well-established that the Vigiles changed from a firefighting corps into a small number of officials. The praefectus vigilum became a purely judicial official, and the post of tribunus vigilum became a sinecure for retired principes (senior judicial officials) of magistri militum. Firefighting in Rome, as in Constantinople, was carried on by collegia, though each city had a praefectus vigilum. In Constantinople this post was superseded by that of praetor plebis (populi) in A.D.535; the one in Rome just fades out of history. These changes are set out by Jones (1964, pp.691-695, & vol.III, p.215 n.16). Evidence for the continued existence of officers/officials is not evidence for the continued existence of the corps.

The late evidence which Jones cites is consistent in not indicating that any official was specifically charged with firefighting. There is, however, one very late piece of evidence which suggests that the praetores populi might have been involved. This is the scholion on Julian's epitome of Just. Nov.xiii (xxiii). The relevant parts of the epitome and the scholion are as follows:

> "Sin autem incendium in urbe fuerit factum, interesse praetores oportet, vicenos secum habentes milites et tricenos matricarios."
>
> "Matricarii dicuntur illi, quos videmus ad incendia currentes, et portantes spongias cum ferramentis, et alia ferramenta, per quae possint de pariete in parietem transire, et ita incendium extinguere."

(The scholion is quoted by Du Cange, s.v. MATRICARII.) Jones interprets Nov.xiii to mean that the praetors attended fires in order to prevent looting. The evidence of the scholion is not a

complete refutation, as the scholiast might have been wrong. But he does provide a little evidence for later techniques of firefighting - more suitable for rescues than extinction.

A single political mistake - to support Maxentius - led to the abolition of the Praetorian Guard in A.D.312 (Durry 1939, 393f). No such event is recorded for the Vigiles, and, apart from political mistakes, it is unlikely that the Vigiles would have been completely abolished. To have left Rome without arrangements for putting out fires would have put it in an inferior position to many of the provincial cities. A decision to abolish the corps must have entailed the provision of alternative arrangements, probably utilising the Vigiles' large stock of equipment.

VI.3744=31075 seems to reflect some such transitional arrangement. The text is:

DESCRIPTIO FER
QVAE IN COHORTE
CL MAMERTINO E
COSS
MATRONAE CVM CARPENTIS
SIFON
FALC
VNC
B

The first five lines may be expanded:

DESCRIPTIO FER[iarum] | QVAE IN COHORTE [?] | CL(audio) MAMERTINO E[t Nevitta] | CO(n)S(ulibu)S | MATRONAE CVM CARPENTIS

The last four lines have been expanded in two ways. The earlier reading (VI.3744: De Rossi) gave the letter 'I' after the 'N' in "SIFON", giving the expansion "SIFONI[bus]", the name of equipment. The later reading (VI.31075: Hülsen) took the letter

to be 'A', which produces the expansion "SIFONA[riis]", the name of a technician. My own reading of this letter is 'I', and the last four lines are accordingly taken to be the names of equipment: siphones, falces, unc(in)i, and probably ballistae. It is odd for firefighting equipment to be in the hands of matronae (this matter will not be pursued here), but equally it is odd for it to be out of the hands of the Vigiles or collegia. Was it merely household equipment brought out for a parade? If so, what was the cohort mentioned on the inscription?

In the Notitia Urbis Romae, the Vigiles are mentioned as "cohort such-and-such" in seven out of the fourteen Regions, i.e. in the Region which contained their castra. The castra as such are not mentioned. The fourteen excubitoria are included en bloc in the lists at the end of the Notitia. In his edition of the Notitia (1949), Nordh discusses the various thorny problems associated with it, and establishes that we cannot use the appearance of an item in the lists for the purposes of dating either the coming into existence or the ceasing to exist of that item. In any case, the Praetorians are mentioned, and they ceased to exist in 312. The Notitia includes in its lists many features (e.g. buildings) which had a topographical significance, being used to identify places where we would use a number and street name. It is possible that the cohorts of Vigiles had this sort of significance, and that the matronae were in the area covered by the cohort. (The close relationship between the Vigiles' divisions of Rome and the ecclesiastical Regions will be recalled.)

The equipment listed probably was connected with the Vigiles. If the corps were allowed to run down (e.g. by ceasing

to recruit), it would have been practical for the officers and other key men to remain, together with the equipment for as long as it lasted. This would enable the collegia to work themselves in, and would explain the appearance of equipment without the corps. The appearance of two centurions, of the Second and Seventh Cohorts, at Portus in A.D.386 suggests that the premises of the Vigiles remained occupied by them or their successors. The "multiplex auxilium" which attended a fire in Rome in A.D.363 (Amm.23.3.3) may have included the last of the vigiles, working with the collegia.

If we seek an occasion for the decision to run down the corps, in accordance with this hypothesis, the transfer of the imperial seat to Constantinople provides a suitable one. The Vigiles in Rome were very much a feature of imperial life. Constantinople seems to have been given arrangements typical of western cities other than Rome. Rome was left to fight its fires with a stock of equipment, a skeleton staff of ex-vigiles, and great reliance on its collegia.

A parallel for this suggested end of the Vigiles may be found in the apparent running-down of the Urban Cohorts. Late in Constantine's reign these were under the command of one tribune, who also had charge of the Forum Suarium (VI.1156=D.722). As Jones comments (p.693), these were probably paper cohorts.

APPENDIX III

TABLES OF SURVIVAL RATES AND METHOD OF CALCULATION

Use has been made of the Model Life-Tables published by the United Nation (1955). The purpose of these is "to establish, as far as possible, relatively simple patterns of changes in mortality rates in different age groups during the transition from high to low mortality levels. The ultimate aim is chiefly to facilitate mortality estimates for countries and regions of the world in which no adequate mortality statistics have so far been developed" (p.1).

The report constructs 40 models, in which the mortality rates are expressed both as life expectations at birth and also as mortalities per 1,000 for each 5-year age group. The advantage of working in terms of mortality per 1,000 for each age group (the "life-table concept") is that this gives a much clearer indication of the mortality risks in a population than the crude death rate. For example, a population with a large number of old people might have the same crude death rate as a population with a large number of children, whereas the life-table analysis would distinguish the two populations clearly.

For the key index the report selected the rate of infant mortality, supplemented by the mortality rate for the first quinquennium of life, because it is in this period that the greatest variations are apparent between the various levels of mortality. We are not, however, bound to use this key index: we may use other portions of

the tables, as explained on page 1: "In modern nations improvements in conditions of living and standards of health are reflected in gradual shifting of mortality from earlier to later periods of life - a postponement of premature deaths - which brings the actual pattern of mortality closer to the ideal. Relative to their earlier levels the risks of mortality during infancy and childhood are reduced most substantially, but smaller relative improvements are also made during maturity and even at later ages. Thus the curve describing mortality risks by age sinks to a lower level, but its shape is not fundamentally affected. Quite generally, the relationships between the mortality rates of adjacent groups retain a notable consistency at all levels of general mortality." Figure 54 is a copy of Figure 9 from the report, which shows how the curves which describe some of the Models are all of the same pattern. In particular, it shows that a change in the level of mortality affects all the age groups in the same way (i.e. if the life expectation at birth goes up or down, the life expectation for all the age groups will go up or down by a related amount). Thus, if we possess data for one portion of the age scale in any population we can predict mortality rates of other portions by selecting the most appropriate Model. The lower the age group of our data the more accurate will be the predictions.

The age groups in which we shall be specially interested lie about midway between the optimum group from the point of view of discussing mortality and the worst group, and start around the age of 20. We must therefore consider the caution given by the report on page 21 concerning the accuracy of the Models: "Finer variations in the pattern, as well as peculiarities that may occur in individual populations, are necessarily glossed over."

The curves which describe the Models are to some extent disturbed both by the method of construction and also by irregularities in the basic data. In the more advanced countries there are accurate records of the number of births and infant deaths, while in less developed countries these figures are often inaccurate and tend to underestimate the rate of mortality in the first few years of life (pp.3f.). The worst mortality rate noted in the report (though not utilised) is in fact an unofficial one, worked out by Davis (1951) for India in the period 1911-1921. For this period the estimated life expectation at birth is only 19.42 years (male) and 20.91 (female), and the population increased by only 0.09%, which is negligible. It is, indeed, unlikely that any population could maintain its numbers if its average life expectation at birth is much less than 20 (p.2). Despite this, the lowest life expectation at birth described in the tables (Model 40 and page 16) is 18.8 years, though it is not clear whether this is intended to represent a declining population (as Davis' data for a barely increasing population might be taken to imply). Moreover, for some of the higher age groups the theoretical predictions diverge slightly from the actual observation (p.21).

The middle portions of the age scales, in which we are chiefly interested, are not subject to the latter divergence, and in addition these portions show least variation between the various Models. This would be a disadvantage if we had to extrapolate from the middle portions to the extreme portions, but in our particular application of these tables we work the other way round, since the data by which we select an appropriate Model covers periods of 20 and 25 years starting from ages of 15, 20, 25 and 30, and the prediction which we make is for a mere 6-year period starting from age 20. We have a

further advantage in that, however inaccurate our calculations concerning mortality, there is no possibility of the errors adding up to give anything approaching the annual loss of approximately 10% which we have to explain in the case of the Vigiles. Nor could any errors in calculating this loss of 10% accumulate negatively to approach anywhere near the figures derived from the mortality tables. It is therefore possible to use the results to indicate approximately how far normal mortality is likely to have accounted for some of the losses from the Vigiles, and to indicate how far other factors must have been operating. We can thus use the tables meaningfully, and the caution concerning the accuracy of the tables does not invalidate either the method or the results.

In view of Hopkins (1966, 263) it was not considered worthwhile to use the Models which imply a life expectation at birth of much above 30 years. On the other hand, since Brunt (1971, 133) suggests that the free population of Republican Italy failed to reproduce itself, it was considered worthwhile (and correct, as it turned out) to use all the Models right down to no. 40, which describes the life expectation at birth of a population which probably is just maintaining itself. Since we are now concerned with legionaries and firemen, females are ignored.

The table which follows is the relevant portion of the male life-table "Male life-table mortality rates for the specified age intervals in forty theoretical models" (U.N. Table 7). The choice of Models has been explained. The choice of age groups was determined by the range of ages likely to be encountered among legionaries and vigiles, with most men being recruited between the ages of 15 and 30 and serving, in the case of legionaries, up to 25 years (i.e. to age 54).

Model No.	Mortality rate for specified age group							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
29	41.08	56.37	61.32	68.12	78.63	96.00	118.68	145.18
30	43.81	59.71	65.40	73.16	84.91	103.79	127.86	157.40
31	46.42	62.58	69.24	78.03	91.15	111.66	137.29	167.54
32	49.02	65.39	73.07	82.95	97.48	119.68	146.97	177.89
33	51.62	68.15	76.89	87.88	103.91	127.87	156.89	188.45
34	54.42	71.30	80.95	93.17	110.87	136.79	167.42	199.76
35	57.24	74.41	85.02	98.59	118.17	146.24	178.65	211.79
36	60.03	77.43	89.03	103.96	125.44	155.69	189.89	223.72
37	62.80	80.37	92.94	109.28	132.75	163.30	201.27	235.77
38	65.55	82.23	96.80	114.66	140.23	175.26	213.16	248.16
39	68.20	85.94	100.50	119.80	147.47	184.97	224.81	260.22
40	70.82	88.54	104.08	124.85	154.65	194.65	236.36	272.00

For convenience both in calculating and in use, the above mortality rates are converted to show, in the table below, the rates of survival per 1,000 for each age group.

Model No.	Survival rate for specified age group							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
29	958.92	943.63	938.68	931.88	921.37	904.00	881.32	852.82
30	956.19	940.29	934.60	926.84	915.09	896.21	872.14	842.60
31	953.38	937.42	930.76	921.97	908.85	888.34	862.71	832.46
32	950.98	934.61	926.93	917.06	902.52	880.32	853.03	822.11
33	948.38	931.85	923.11	912.12	896.09	872.13	843.11	811.55
34	945.58	928.70	919.05	906.83	889.13	863.21	832.58	800.24
35	942.76	925.59	914.98	901.41	881.83	853.76	821.35	788.21
36	939.97	922.57	910.97	896.04	874.56	844.31	810.11	776.28
37	937.20	919.20	907.06	890.72	867.25	834.70	798.73	764.23
38	934.45	916.77	903.20	885.34	859.77	824.74	786.84	751.84
39	931.80	914.06	899.50	880.20	852.53	815.03	775.19	739.78
40	929.18	911.46	895.92	875.15	845.35	805.35	763.64	728.00

From this table of survival rates, it is possible to calculate the percentages of men who survive after 20 and 25 years from each of the ages 15, 20, 25 and 30. Each of the survival rates may be regarded as a decimal fraction of the number of men existing at the start of each 5-year interval (i.e. unity). Thus we multiply the fractions by each other to cover the desired period of overall survival, and then to convert the result to a percentage we multiply by 100. For example, to calculate the overall percentage of men surviving over 20 years starting at age 20 in Model 29, the calculation is:

$$0.94363 \times 0.93868 \times 0.93188 \times 0.92137 \times 100 = 76.052\% .$$

The two tables below show the calculated survival rates over periods of 20 and 25 years respectively, starting from each of the ages 15, 20, 25 and 30.

Model No.	Percentage survival rate over 20 years from specified age			
	15	20	25	30
29	79.192	76.052	72.858	68.406
30	77.882	74.534	71.040	66.293
31	76.709	73.111	69.283	64.217
32	75.552	71.702	67.537	62.153
33	74.410	70.308	65.802	60.099
34	73.188	68.819	63.966	54.947
35	71.970	67.319	62.024	55.677
36	70.786	65.860	60.273	53.600
37	69.634	64.437	58.486	51.501
38	68.503	63.028	56.701	49.396
39	67.434	61.697	55.013	47.410
40	66.403	60.412	53.379	45.498

Model No.	Percentage survival rate over 25 years from specified age			
	15	20	25	30
29	72.928	68.751	64.212	58.338
30	71.269	66.798	61.957	55.858
31	69.717	64.947	59.771	53.458
32	68.187	63.121	57.611	51.096
33	66.678	61.317	55.478	48.774
34	65.073	59.405	53.257	46.372
35	63.466	57.474	50.944	43.885
36	61.906	55.606	48.828	41.608
37	60.390	53.785	46.715	39.359
38	58.897	51.982	44.615	37.138
39	57.490	50.285	42.646	35.073
40	56.134	48.653	40.763	33.123

It should be emphasised that these two sets of survival rates will be valid for any population for which the Models are appropriate. These results are implicit in the basic life-table mortality rates.

APPENDIX IV

THE VALUE OF ARCHAEOLOGICAL EVIDENCE FOR FIRES

Burnt layers and burnt objects are commonly found in the course of archaeological excavations, and they may occasionally provide evidence for the type and extent of a fire. Only rarely is it possible to ascertain the cause of a fire. This is difficult enough even when it is possible to examine the debris of a contemporary fire, since fire tends to destroy evidence. However, it is sometimes possible to deduce from archaeological evidence why the fire spread in a particular way, and to see what circumstances made a particular situation dangerous, once a fire had broken out.

Much painstaking collation of material enabled Dunning (1945) to describe two major fires in Roman London. One of them is datable by burnt samian pottery to the period of Claudius-Nero, and may be correlated with the burning by Boudicca in A.D.61, which is attested historically. The other is assignable to the decade c.A.D.120-130. Dunning's Figure 3 shows the approximate extent of the fire of 61. The correlation between the area indicated and the area indicated for the early town by Italian and early Gaulish sigillata and Claudian and earlier coins is such as to suggest that the main area of the town was sacked. For the fire of 120-130, Dunning's Figure 7 shows the area of burning, a minimum extent of about 65 acres. He comments (p.59):

> "The spreading out of the sites from west to east suggests that the fire started in the western part of the area and the flames then spread eastwards, fanned by a prevailing west or south-west wind."

This conclusion might be true, but the actual evidence does not warrant it. It is well-known that a fire can change its direction of spread, for example, if the wind changes, and we should not overlook the possibility of a fire creating its own wind (the 'fire-storm' effect); so that the prevailing wind is not the only possible explanation. His comment that the evidence for the burning of the Forum and Basilica at this time is inconclusive is valid, but it may be wondered, from the number of burnings attested for the Basilica, whether this building was burned down so regularly that it is unlikely to have escaped in a major conflagration. Perhaps a slight underestimate of the frequency of fires lies behind Dunning's discussion of the cause of the fire (p.60). He reaches the conclusion that the fire appears to have been accidental, apparently because "no adequate historical context can be proposed for it". He also says (p.60,n.4):

> "The suggestion that the London fire may have been connected with the unsettled state of the province about this time is perhaps worth mentioning, even if only to be dismissed."

It would have been interesting to see his comments if there had been evidence for military operations in the London area at that date: statistically, the fire should still have been accidental. Dunning's paper illustrates well the way in which the evidence for major fires has to be extensive and detailed: but that, despite this, it is possible to draw only very general conclusions.

The period 1 timber building at Boxmoor (Neal 1970) provided an interesting question for the archaeological fire investigator. Neal describes the fire thus (p.159):

> "Destruction of the building was by fire, since large slabs of fallen burnt daub and painted plaster were found over the floors.

> Many of the sleeper-beams and wall-frames survived in the form of charcoal. The wall-frames, which were joined with notched tenons (pl.XIII a), provide useful evidence for the construction of the superstructure, which appears to have had a ceiling-height of at least 7 ft. 6 ins. The building may have been cleared and deliberately set on fire as a means of demolishing the structure to make way for the masonry house, as all floors were barren of finds."

The absence of objects is the sort of detail which can be important in identifying a deliberate firing, though it should be observed that in this particular case a kitchen area with pottery was not identified, and it may well be that there had been combustible objects which left no detectable trace in the excavated area. Now, although we must not assume that people will have acted reasonably, it is worth noting that burning is not necessarily a good method of clearing a site; and, in this case, what was left on the site was no more and no less than the bulk which would have been produced by simply pulling down the house, less the roof. This might have been fired to remove it. Otherwise, the building was not completely destroyed, and we should reckon with the possibility of an accidental fire, possibly in an unoccupied building. There is no intention to raise quibbles over Neal's interpretation; but it does seem that the evidence is not sufficient to suggest the cause of the fire. Otherwise, his observations are useful and he raises relevant questions.

The problem of the use of fire as a means of destruction has been discussed by Col. Gordon (1935) in connection with his own experiences in firing Wazir huts during the winter of 1919-1920. He discusses the effectiveness of fire and the sword as a means of destroying a village, and comments (p.149):

> "I have learned by experience that the casual application of a

torch will not necessarily set fire to anything."

This does, yet again, exphasise that the circumstances have to be right for a fire to take hold, and that a variety of circumstances will often result in a source of heat remaining only potentially dangerous. In the case of Wazir huts with mud roofs and rubble walls, it was necessary to use explosive to break the timber supports so that the huts were effectively destroyed. Mere burning was not enough, as roofs could easily be repaired. Gordon also draws attention to the more general social factors involved in destruction of communities (p.152):

> "It was the collapse of civilization under the impact of barbarism, the extinction of good administration causing canals to silt up, communications and trade to disappear and cities to fall into ruin, that produced famine, chaos and devastation to a far greater degree than Fire and the Sword."

The social context of a fire is very important.

An interesting case of bad planning leading to a fire was discovered at Corbridge on Site XX (Richmond and Gillam, 1955,235-238). In the early Antonine period an oven or furnace and a wooden hut were built very close to each other, and in due course the hut burned down (p.238):

> "The burning here is isolated. There can be no doubt of the story. The folk who placed a furnace in the 8-foot gap between the back of the rampart and a wooden shed reaped the reward of their carelessness when the shed was burnt down and completely destroyed. Its smouldering ruins were covered in sand, not soon enough to save it, but soon enough to prevent the fire from spreading to other buildings in the fort."

Probably water was applied initially, or else the building was pulled down. Earlier in the same report, an interesting detail of another

fire is noted (p.221). Soon after A.D.98 a building burned down, and

> "The fierce fire by which it was destroyed was particularly marked in a minor partition which seems to have been exclusively of timber, the second to the south."

Vitruvius described a type of partition which would burn well (7.4.1), though he also commented on the high flammability of other partitions (2.8.20). Architects, like the army, had their lapses.

These examples of archaeologically-attested fires indicate some of the possibilities for interpretation. For conflagrations, it is necessary to have a large amount of detailed evidence, as at Corbridge, before anything approaching validity can be achieved in the conclusions. In the case of the City of Rome, such evidence does not exist, despite the large amount that the years of casual and small-scale digging have managed to produce. The scale of the City makes great demands on the evidence, and in the case of Rome there does exist other evidence, in the form of literary and epigraphic records, which is capable of generalisation, and telling us some of the general aspects of fire hazards in Rome. It is true that, compared with the number of buildings and of fires that there must have been, the amount of this evidence appears small; but it is far more informative than the evidence available for other cities which may include literary references but is mainly archaeological. Moreover, the narrative descriptions of the fire of A.D.64 have their nearest parallels in the modern period. Jones (1968), mainly interested in the economic aspects of conflagrations in post-medieval southern England, concentrates on social factors, and achieves interesting and valid conclusions without the use of archaeology other than inspection of surviving buildings.

For the purposes of this thesis, archaeological evidence for fires in Rome has not been used, frequently though it appears in the excavation reports. It is possible that a lot of detailed work might prove successful in relating this evidence to fires attested more precisely by written records. For the present, however, the large amount of evidence from excavations which were inadequate in various ways has been left on one side. It is especially important, with a subject like fire, to use evidence of reasonably certain validity.

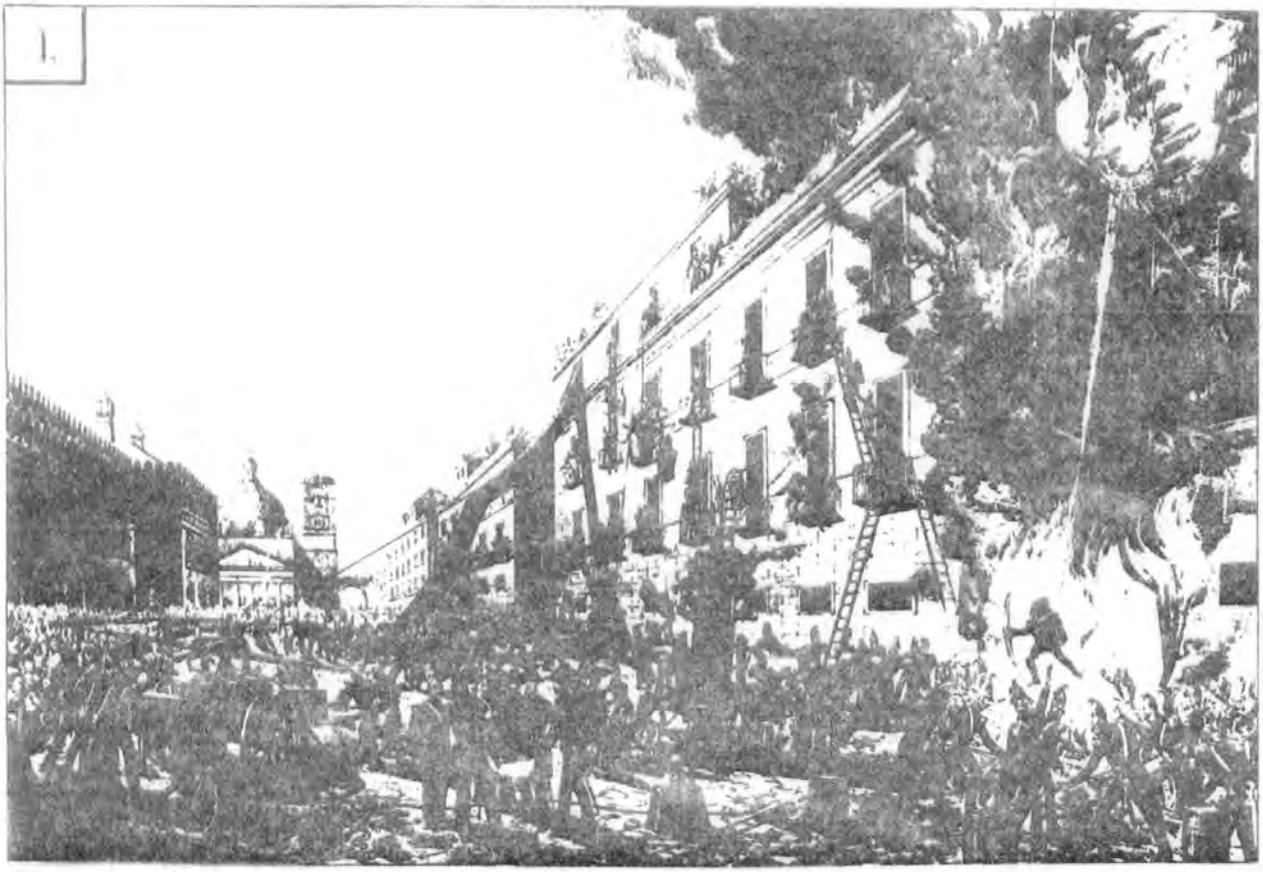
ADDENDUM TO 6.3.7

The second (1973) edition of Meiggs (1960) notes on pages 582 and 583 the discovery of a Domitianic building below the Ostian castra vigilum (F. Zevi in Not. Sc. 1970, p.7). A fragmentary inscription, probably concerning Trajan and probably set up by the seven cohorts of Vigiles, was found below the mosaic. Another inscription was found, possibly concerning Hadrian in the earlier part of his reign. Meiggs comments: "It seems that here too [i.e. as well as the Baths of Neptune] Hadrian was following where Domitian had led, and such little evidence as is available is at least compatible with the adoption of the Domitianic plan by Hadrian's builders."

It remains a separate question whether Domitian built a fire station. I have not had an opportunity to examine the evidence myself.

ADDENDUM TO 7.6.8

The Hong Kong authorities have recently taken steps to improve the basic services (e.g. electricity), and there is no doubt that this will improve the fire standard of the tenements. The degree of improvement in such a congested environment remains to be seen.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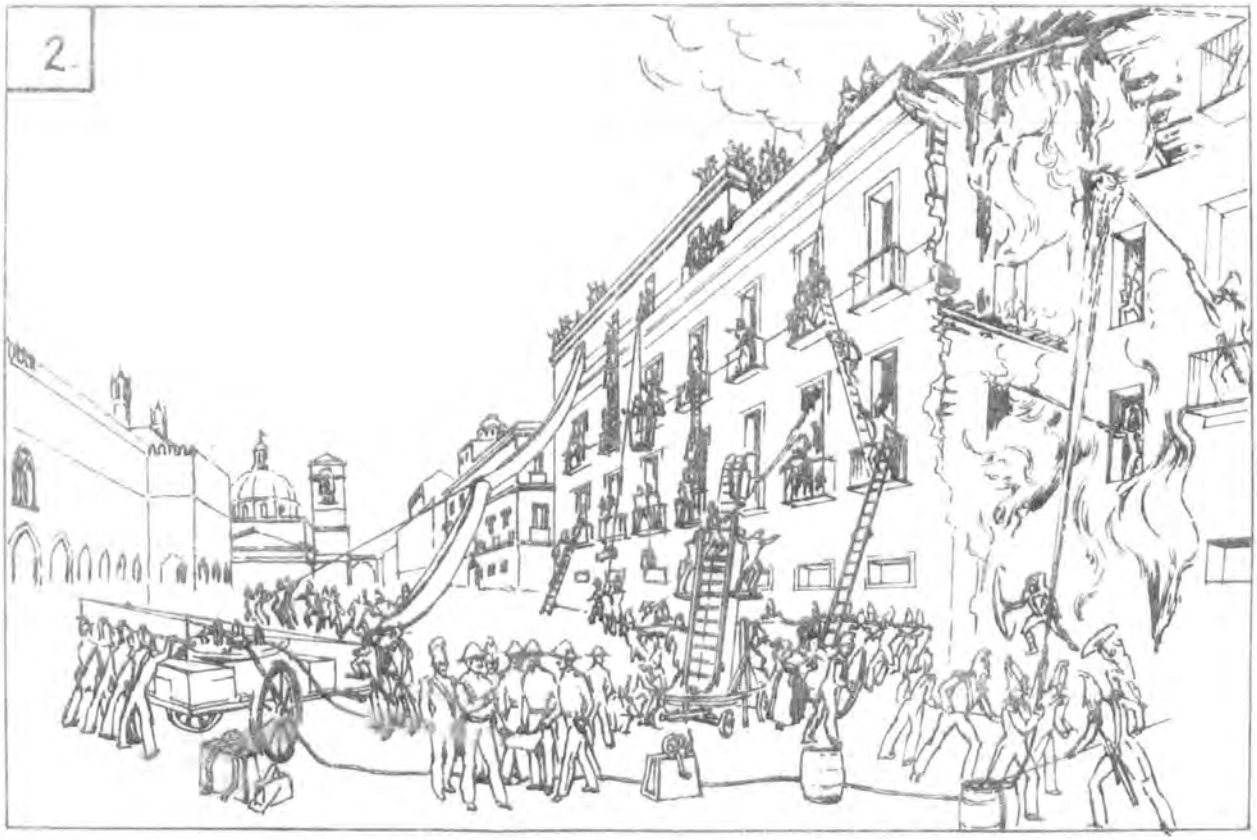
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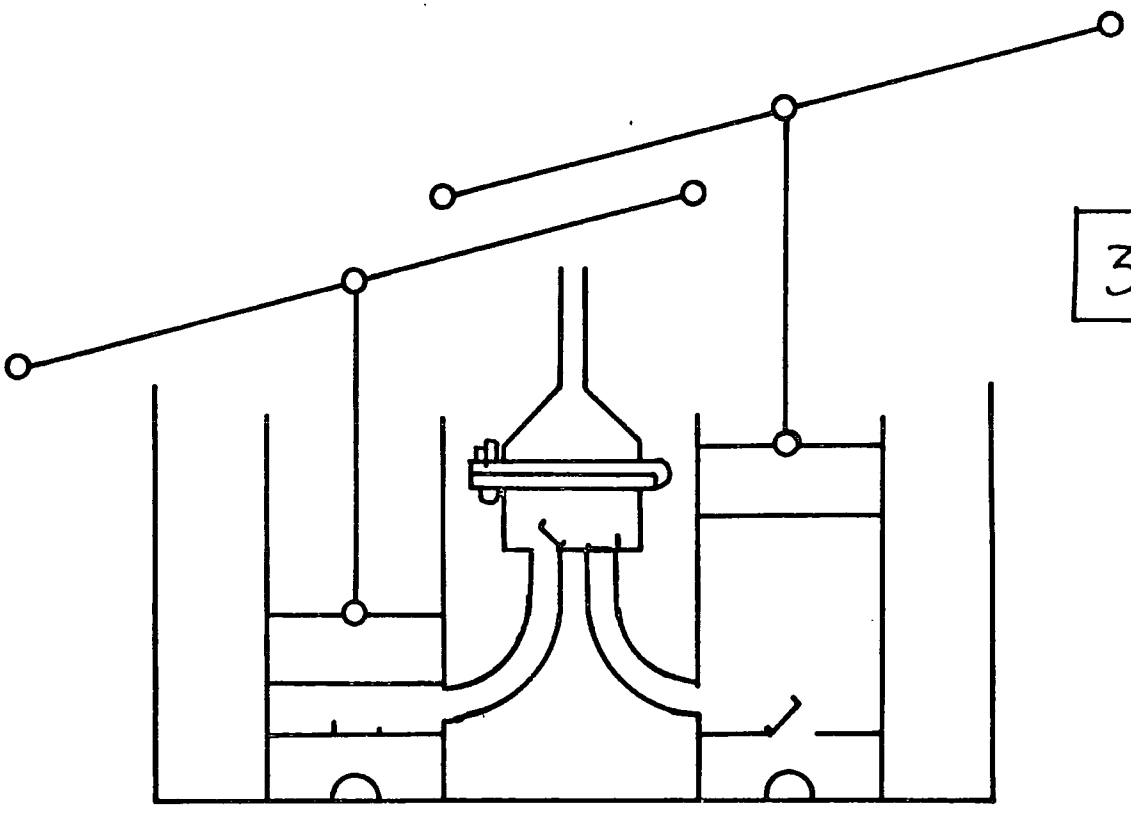

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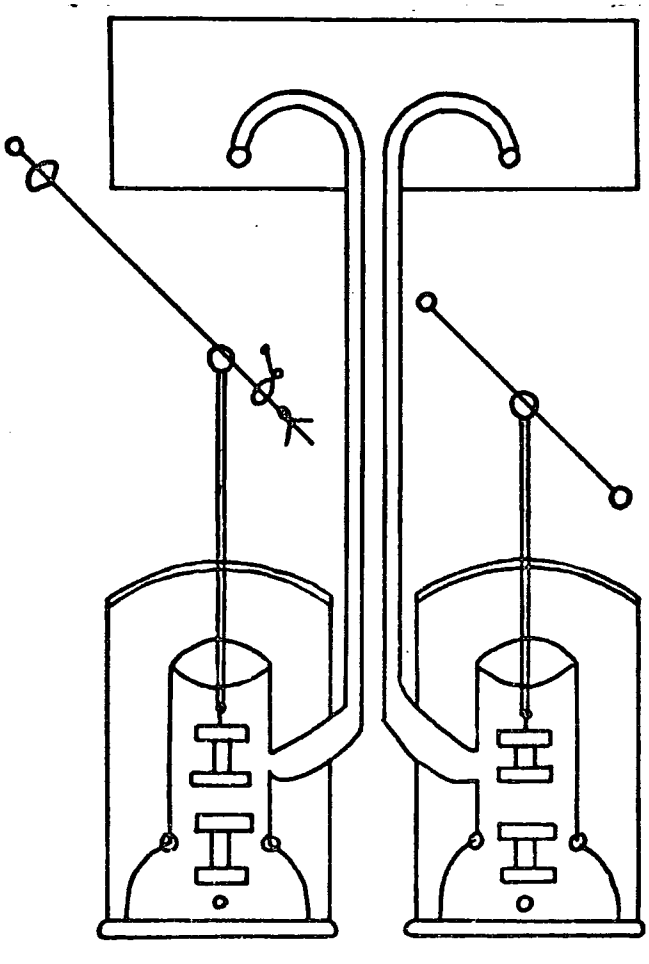

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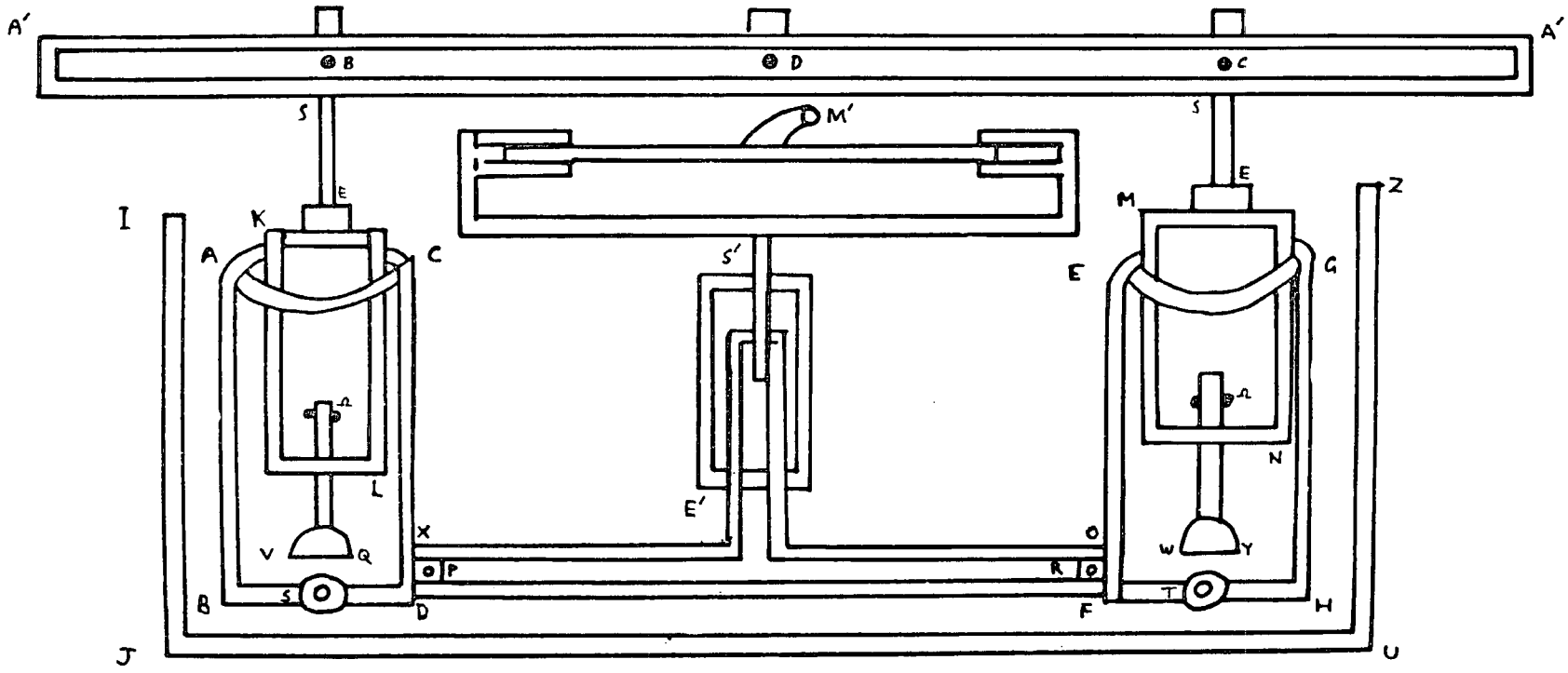

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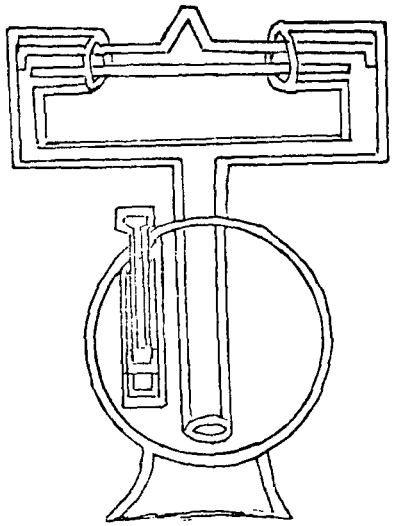

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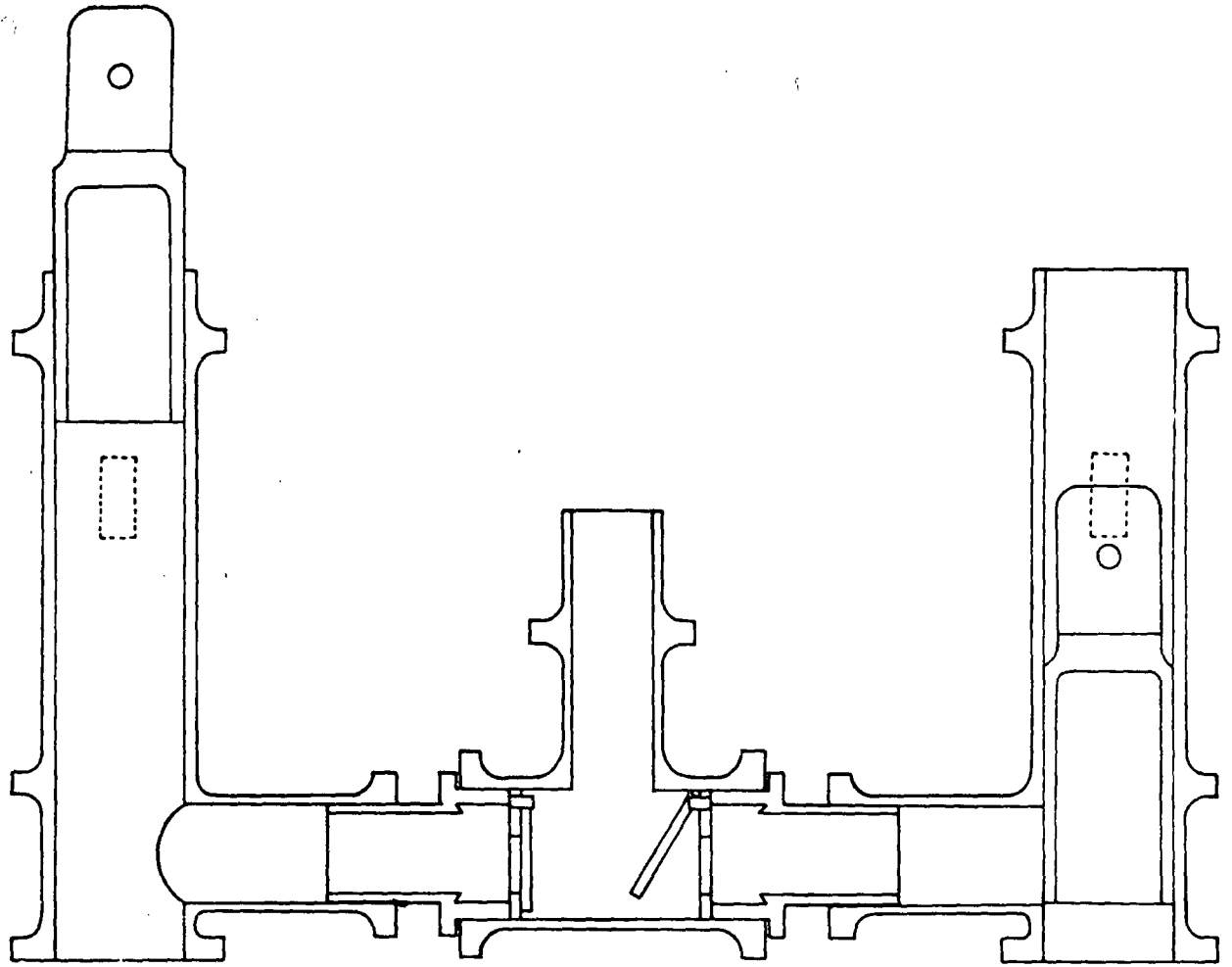

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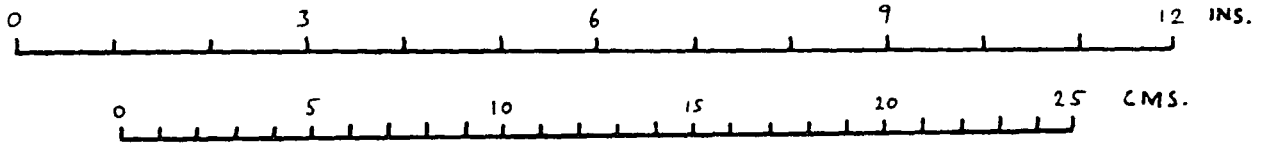

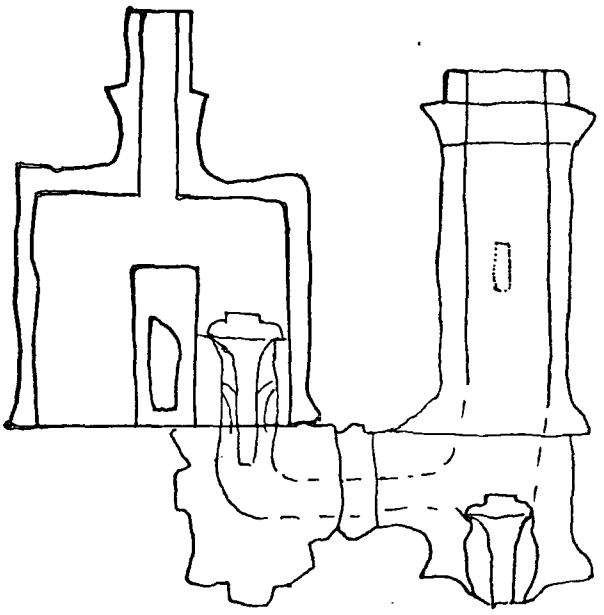

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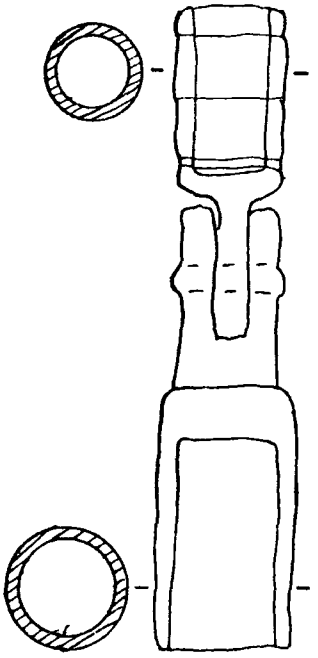

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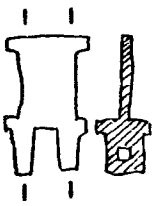

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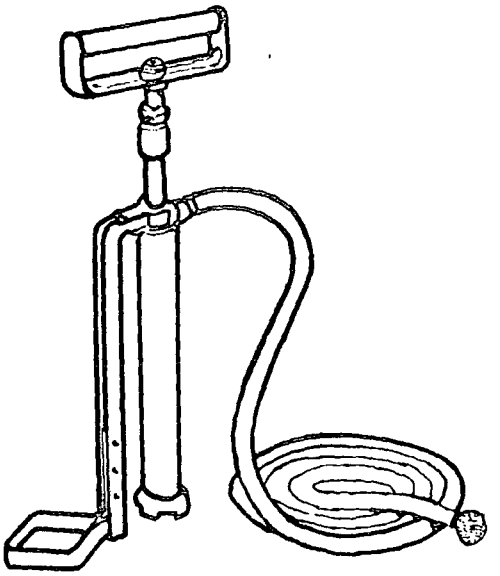

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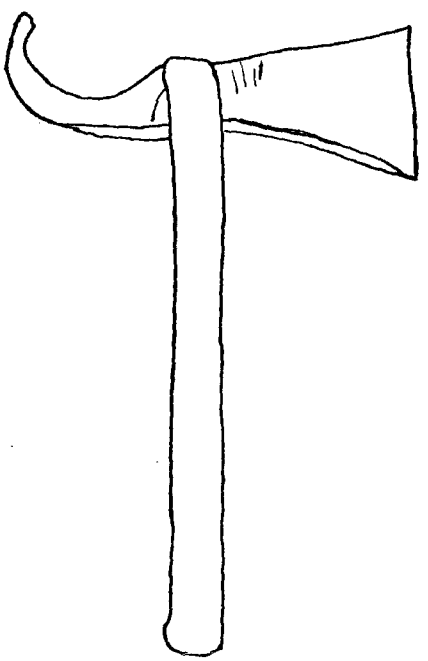

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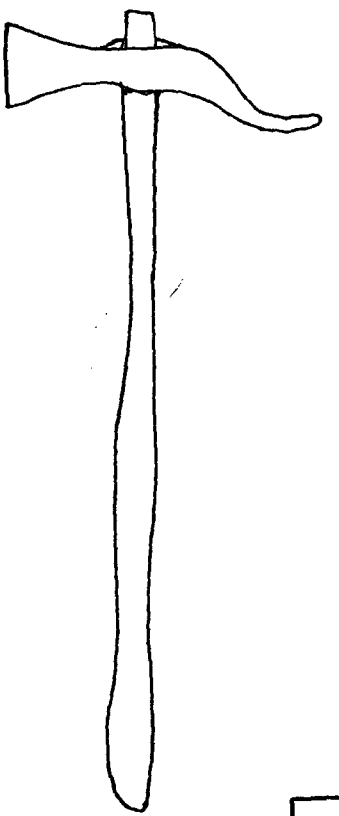

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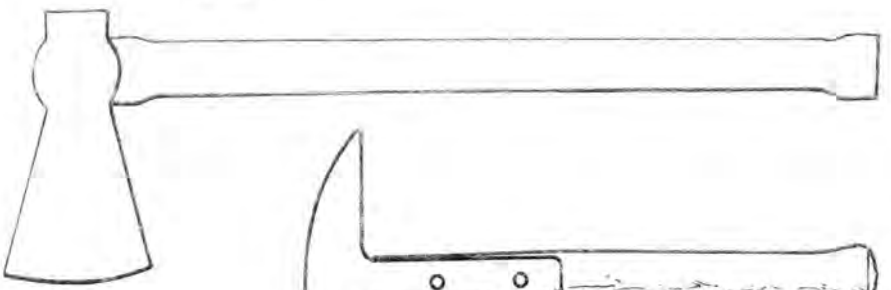

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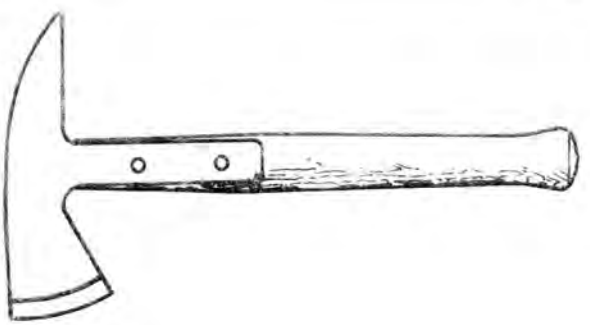

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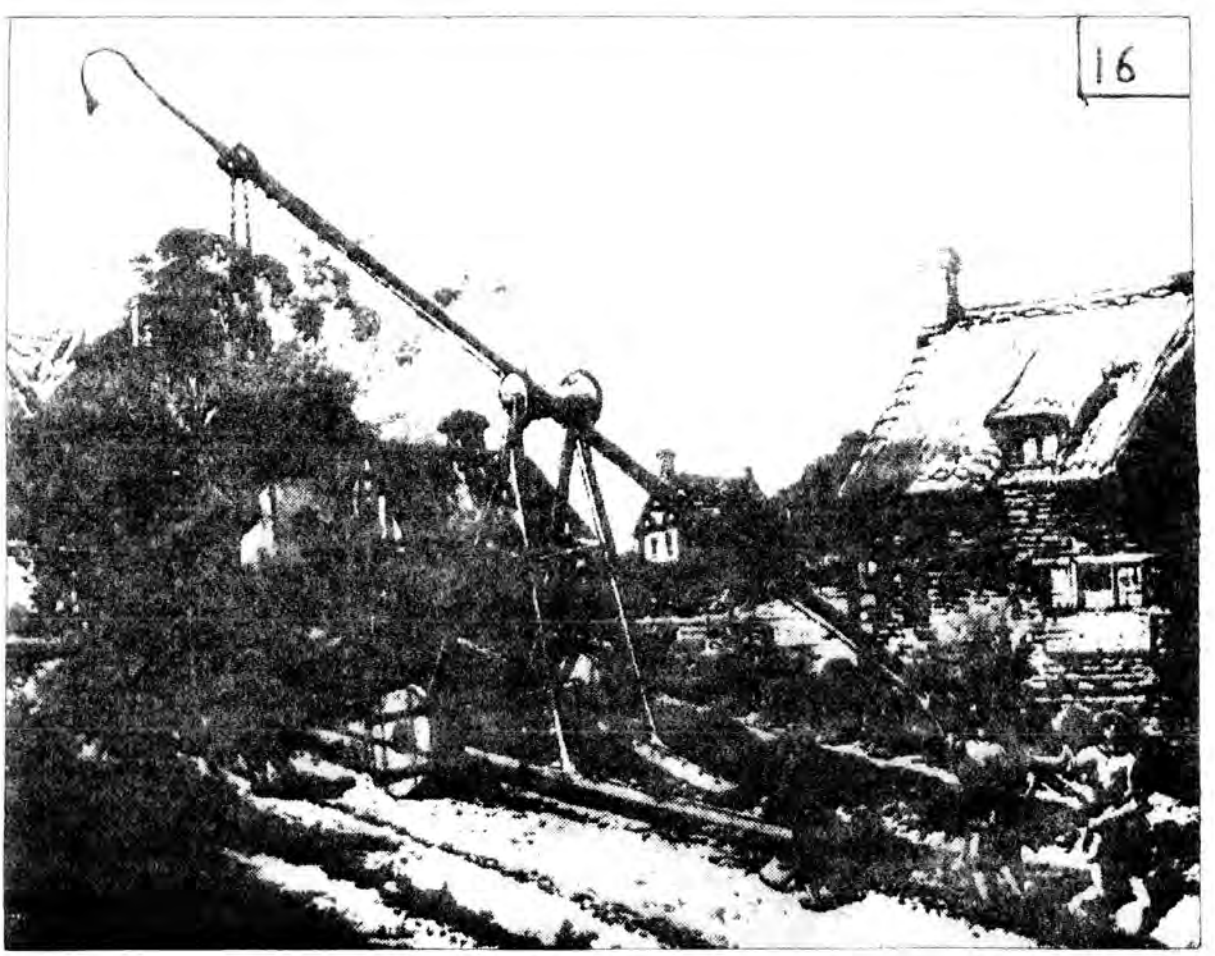

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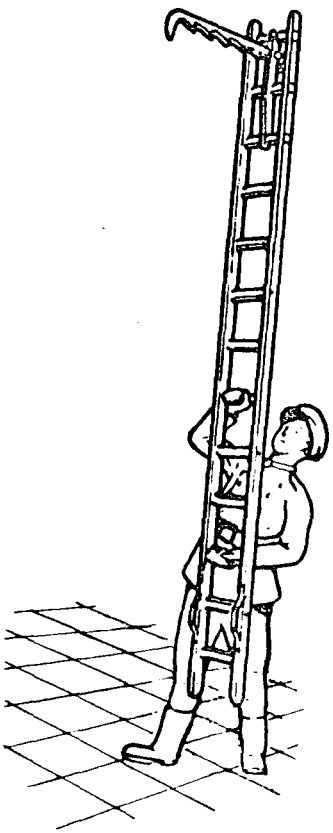

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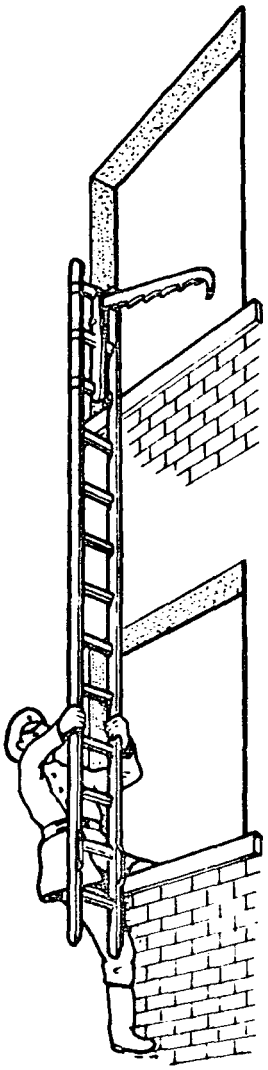

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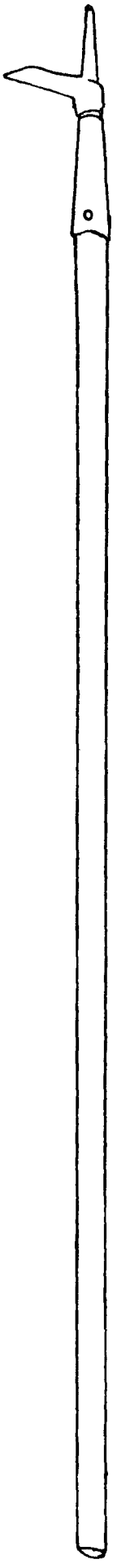

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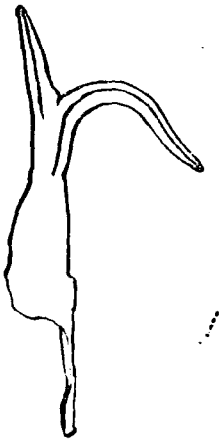

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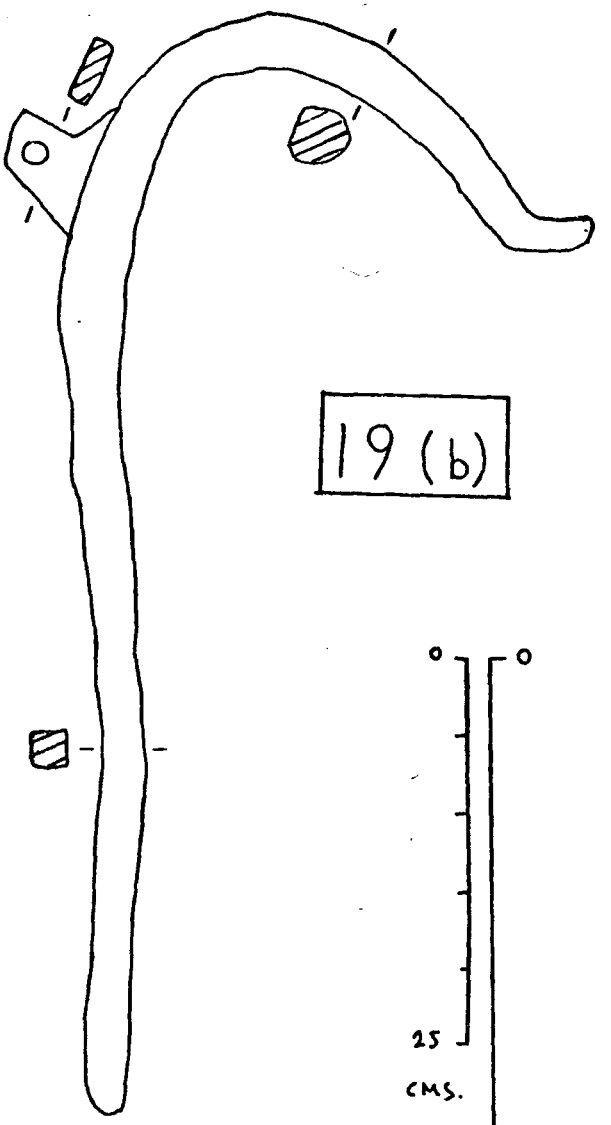

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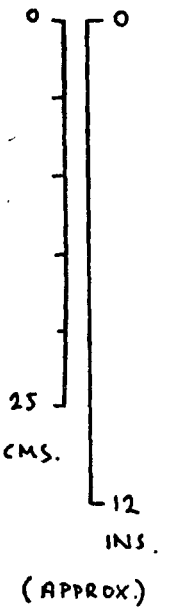

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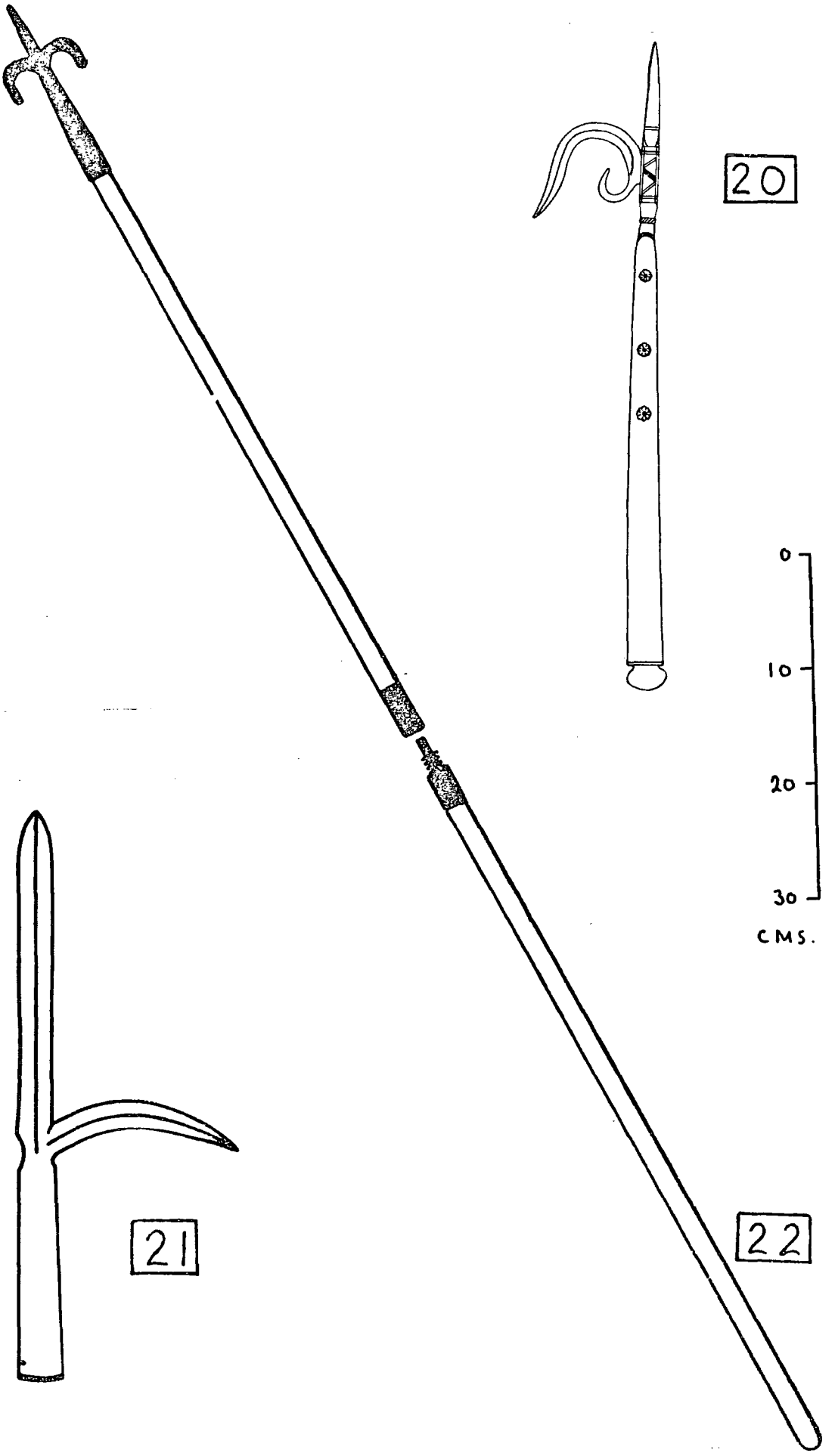

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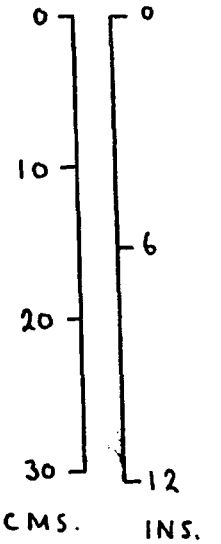
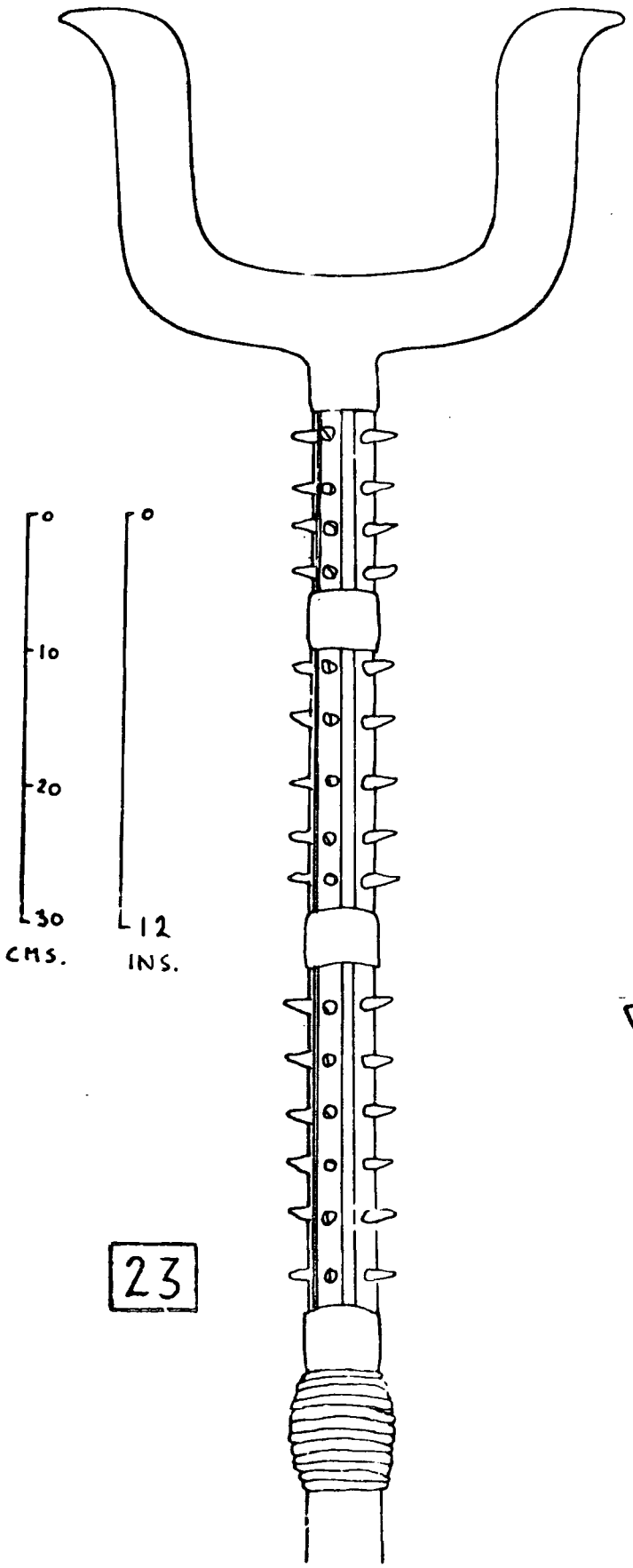
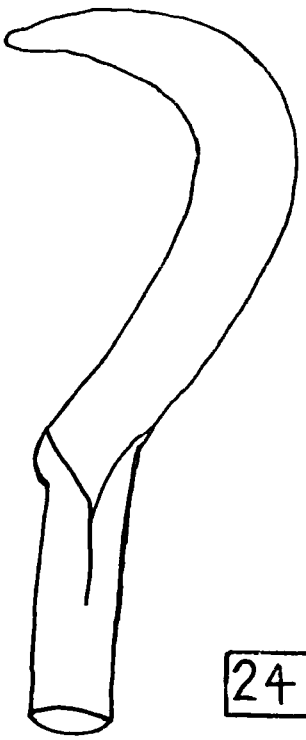


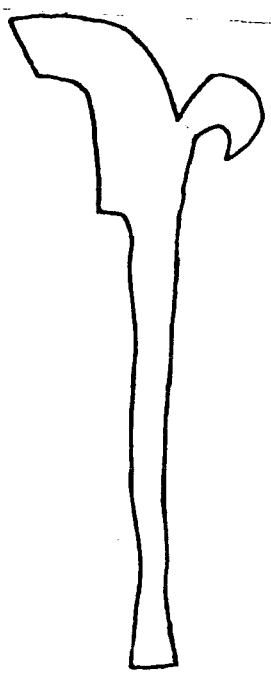


23

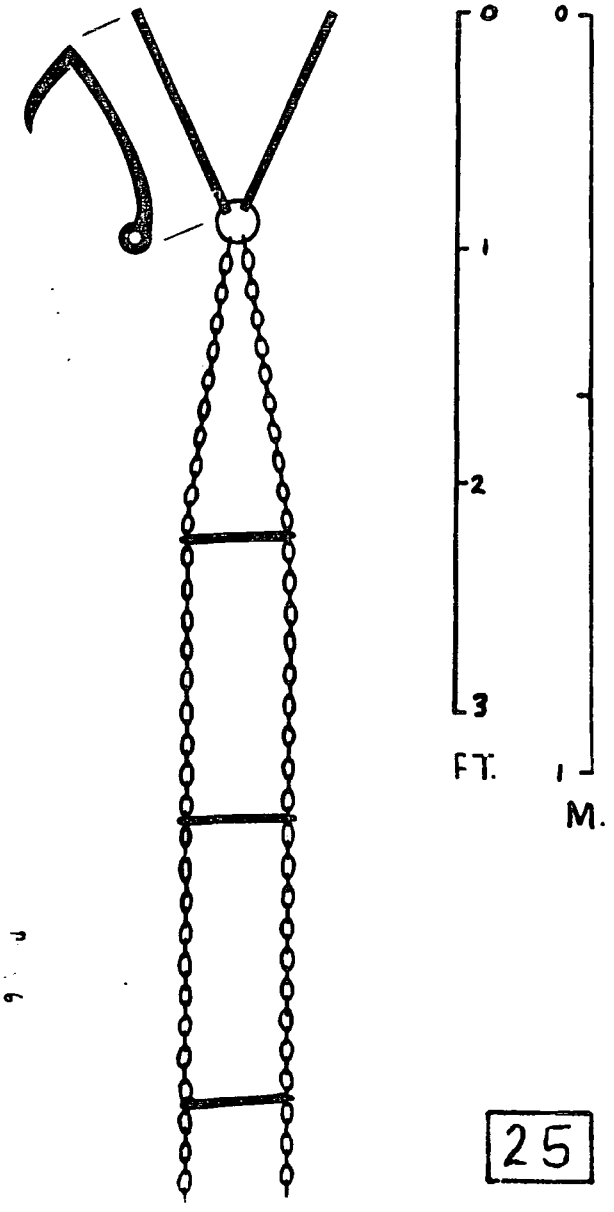


24 (a)

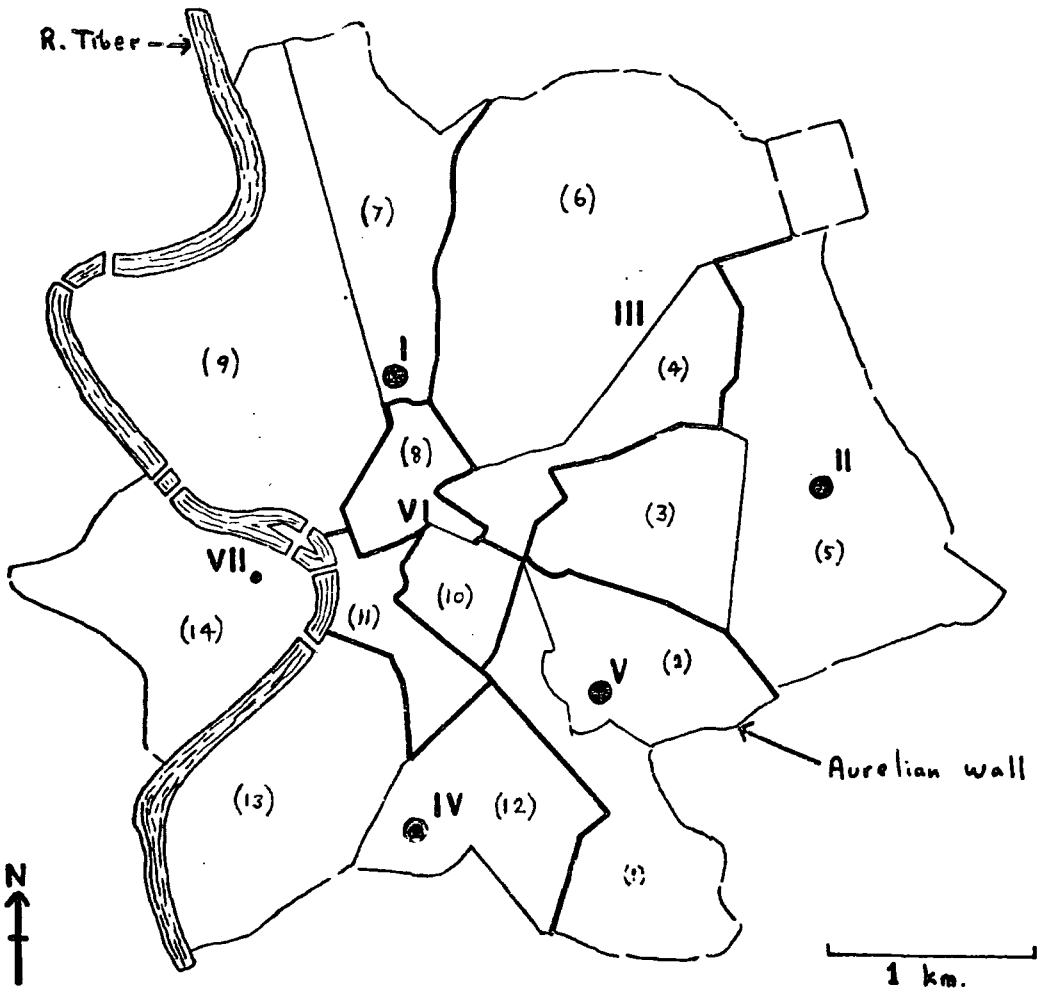
NOT TO SCALE



24 (b)



25



I – VII cohorts of Vigiles

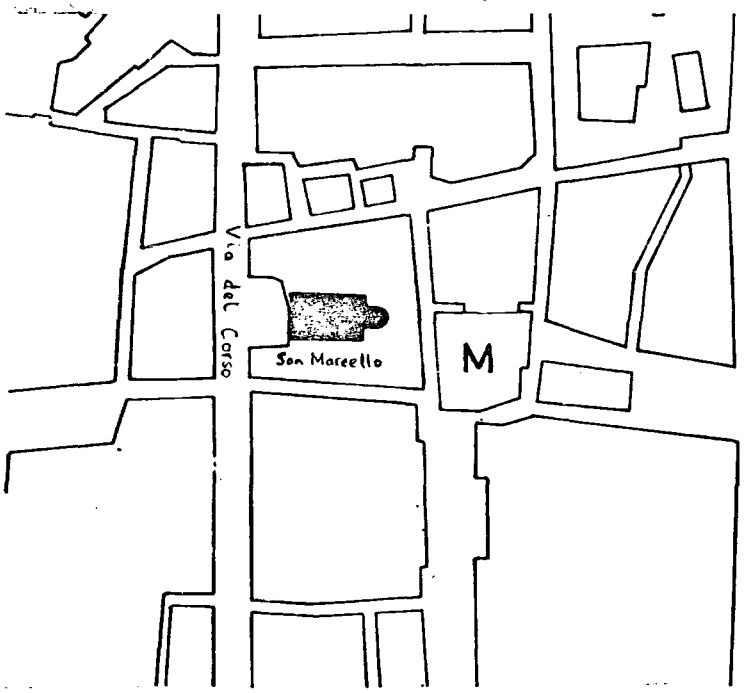
(1) – (14) Regions

● identified castra Vigilum

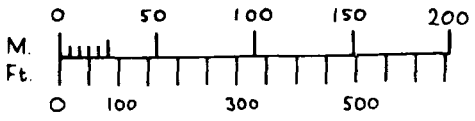
——— cohort boundaries

——— regional boundaries within Aurelian Wall

• identified excubitorium

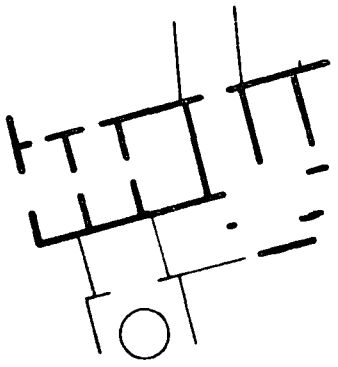


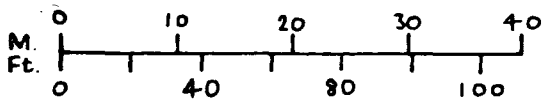
M: Palazzo Muti

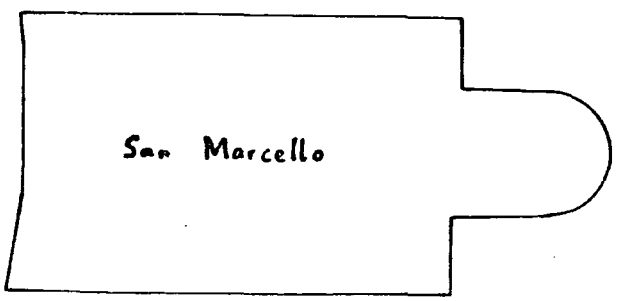


27

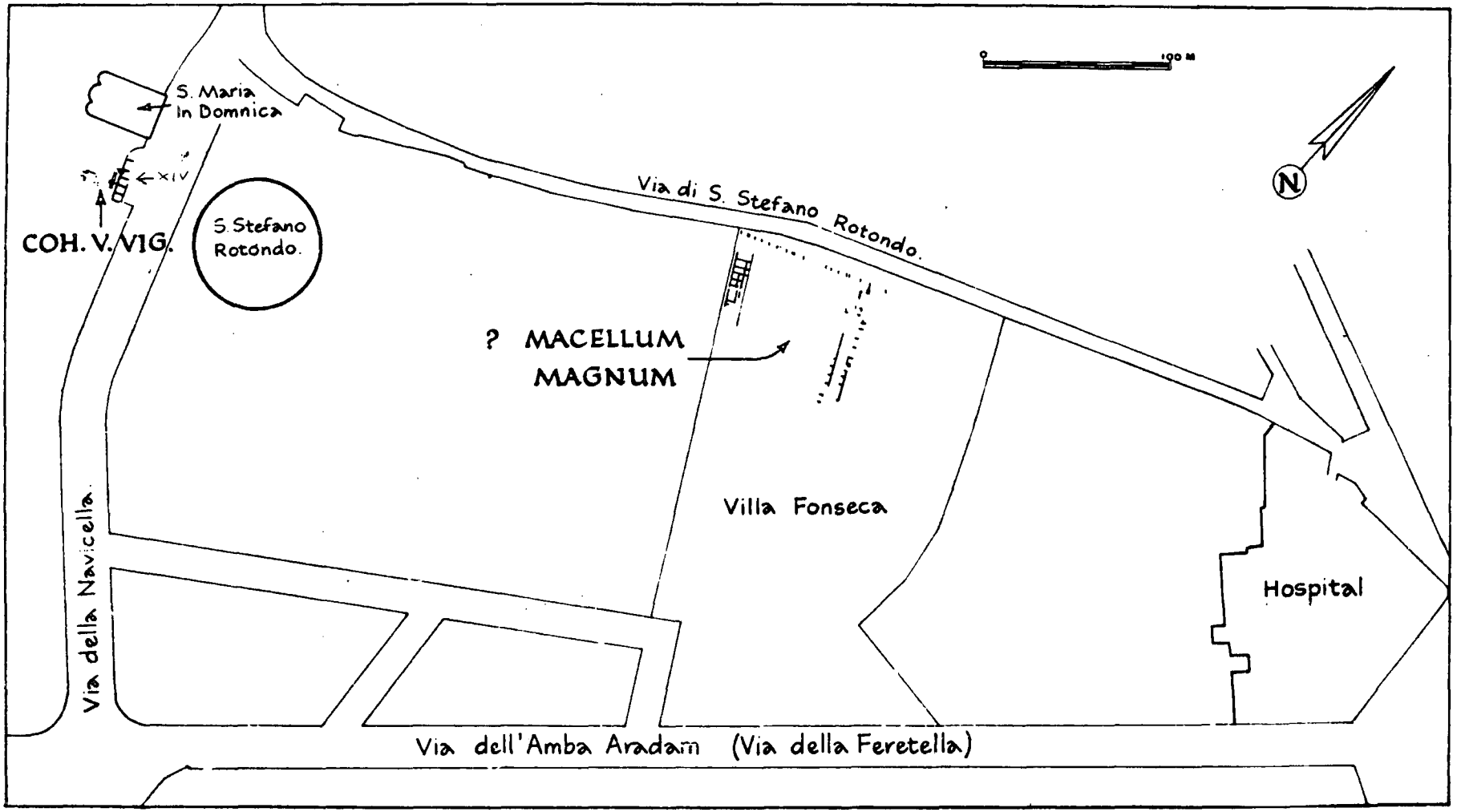
earliest walls
later walls (including baptistery)



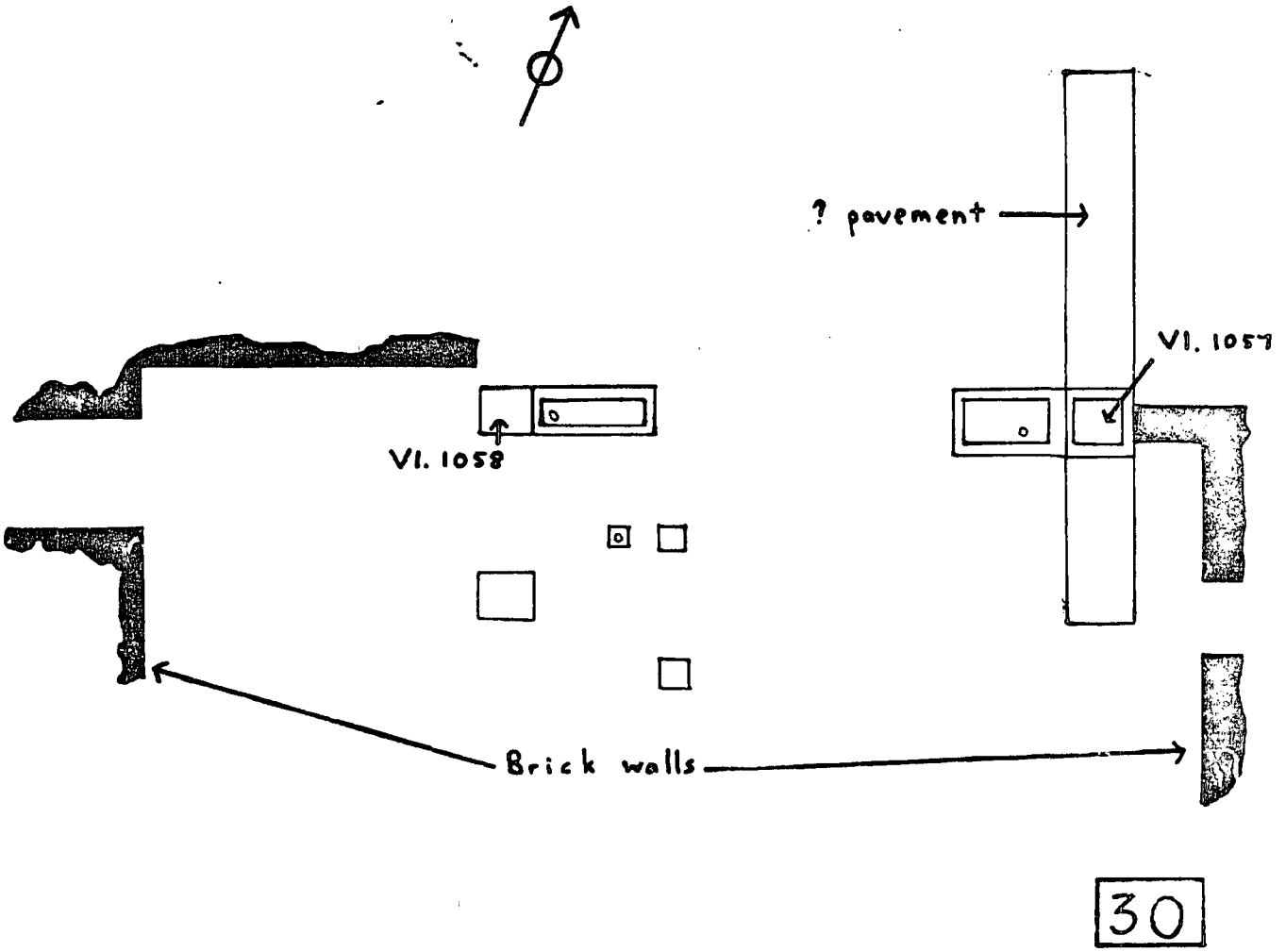




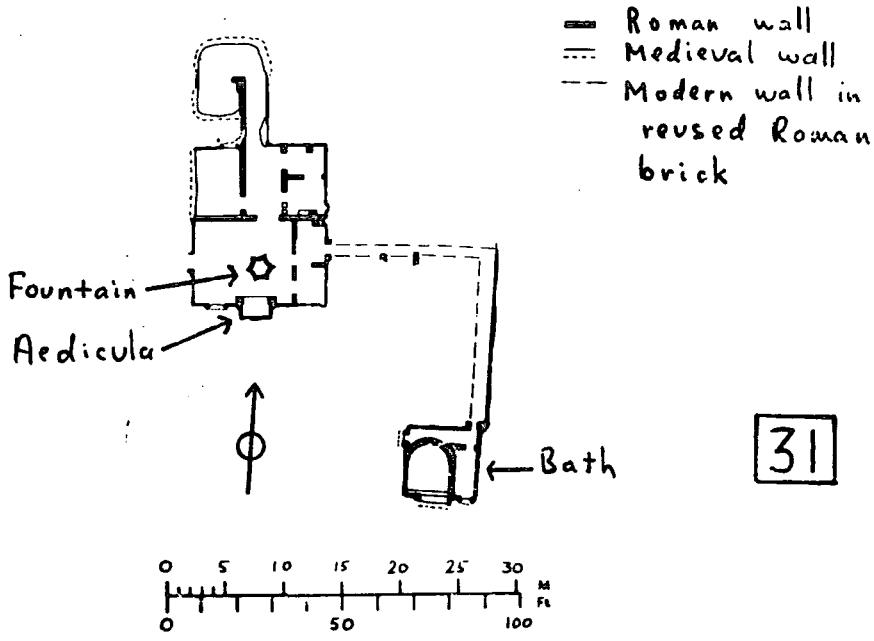
28


S. Maria
In Domnica
XIV
COH. V. VIG.
S. Stefano
Rotondo.
Via di S. Stefano Rotondo.
? MACELLUM
MAGNUM
Villa Fonseca
Hospital
Via della Navicella.
Via dell'Amba Aradam (Via della Feretella)
0
100 M
N

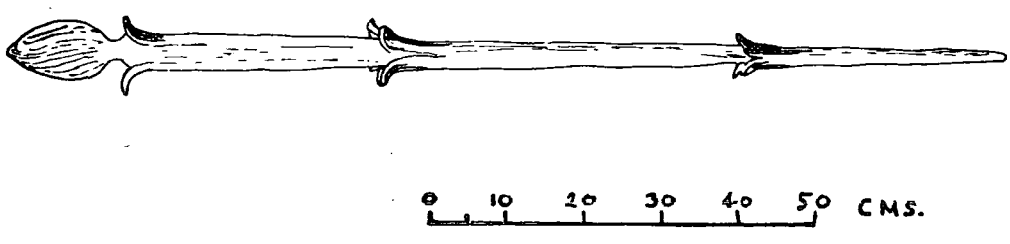
29



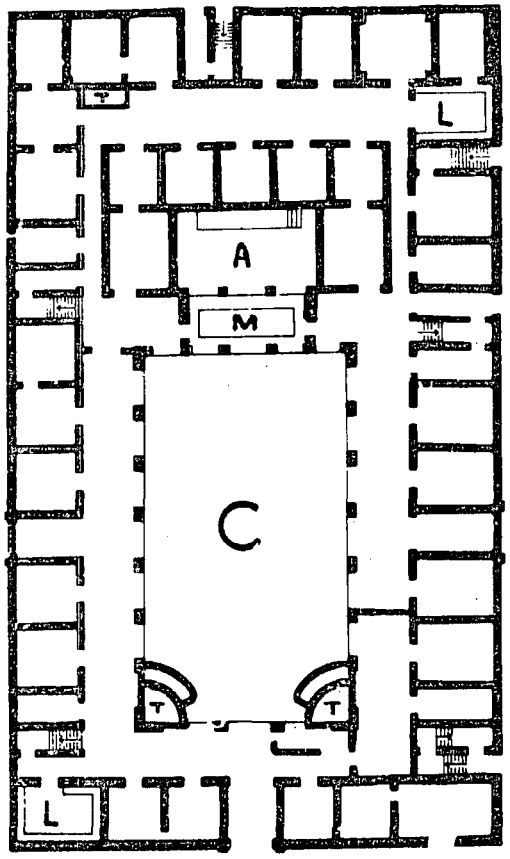
30


Roman wall
Medieval wall
Modern wall in reused Roman brick
Fountain
Aedicula
Bath
0 5 10 15 20 25 30 M
0 50 100 Ft

31


0 10 20 30 40 50 CMS.

32



A 'Augusteum', cella

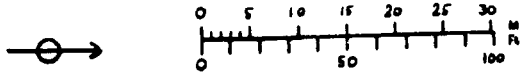
C Courtyard

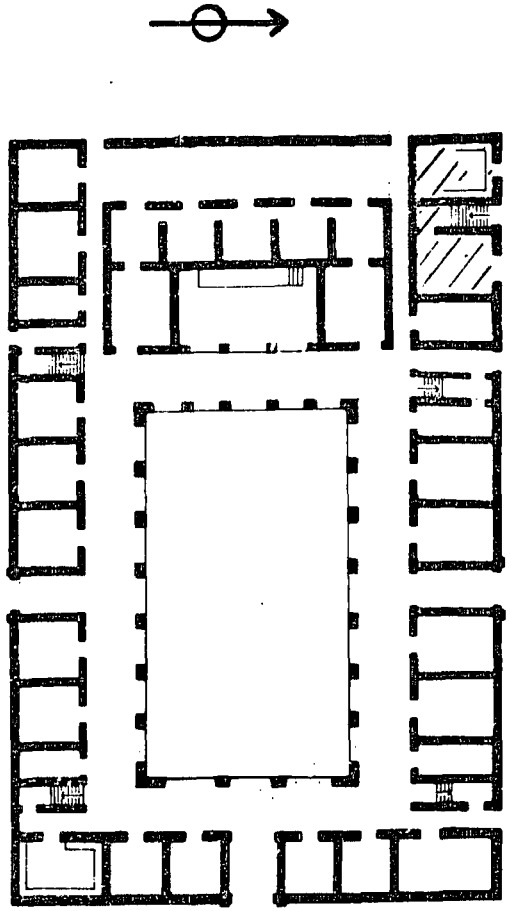
L, L Latrines

M Mosaic showing sacrifices

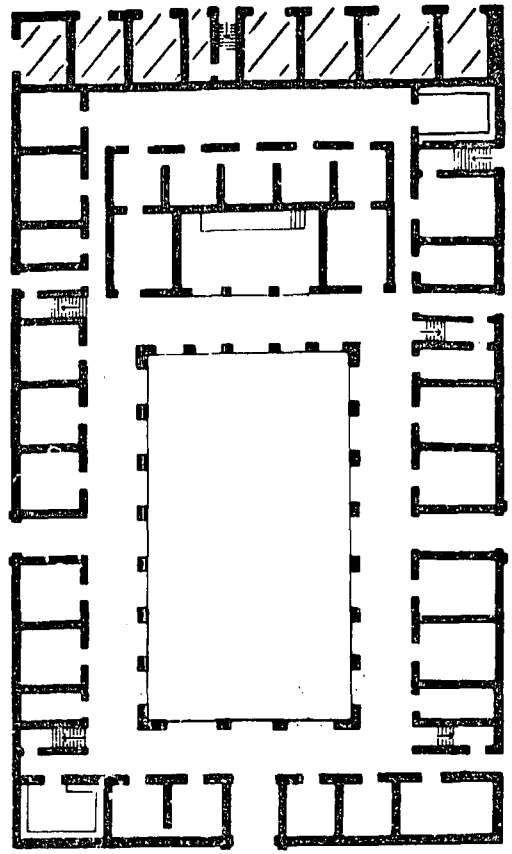
T, T, T Tanks

33





34



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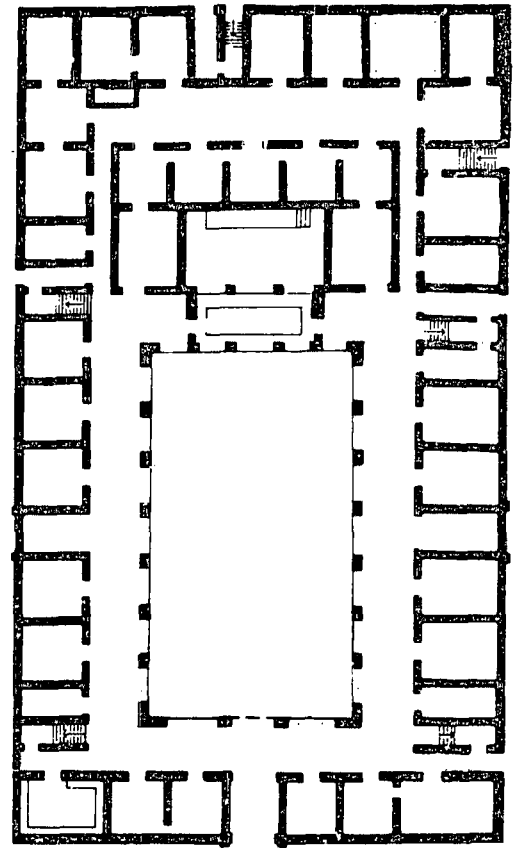
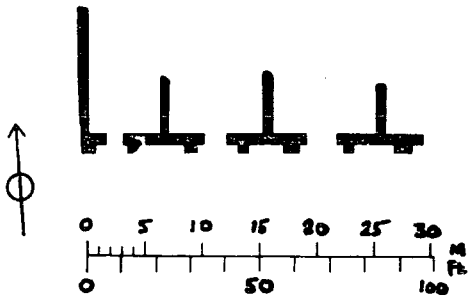
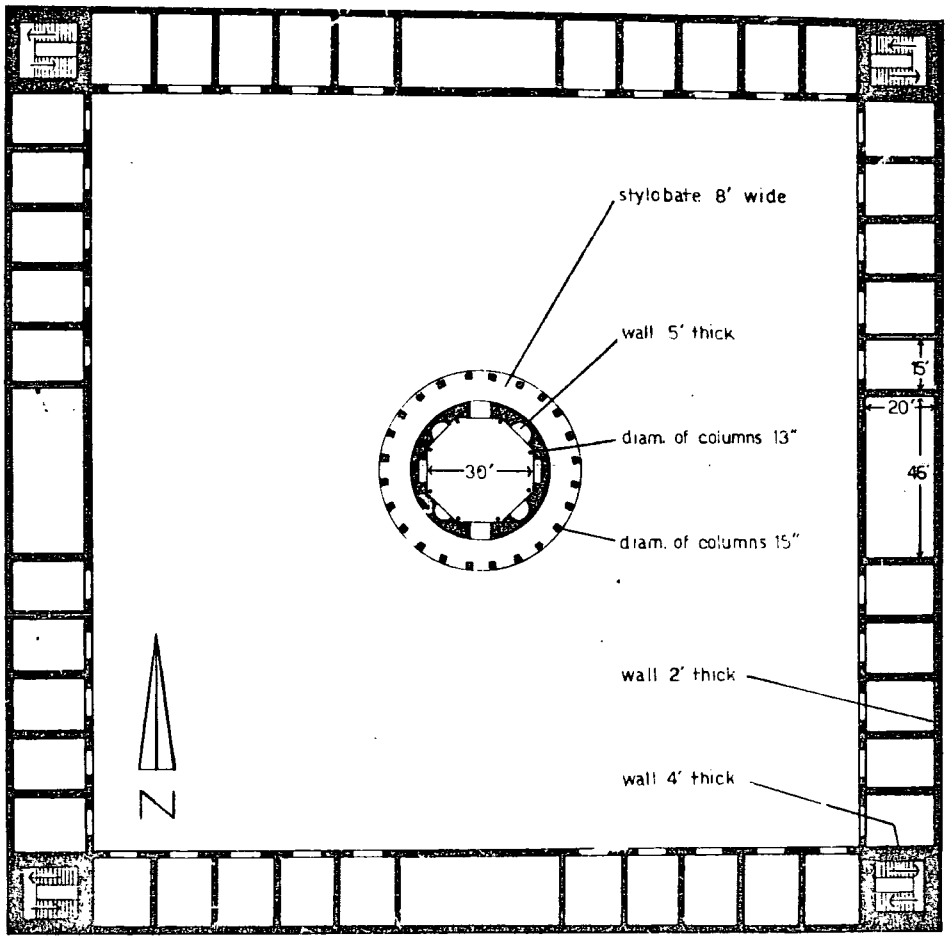


36



37

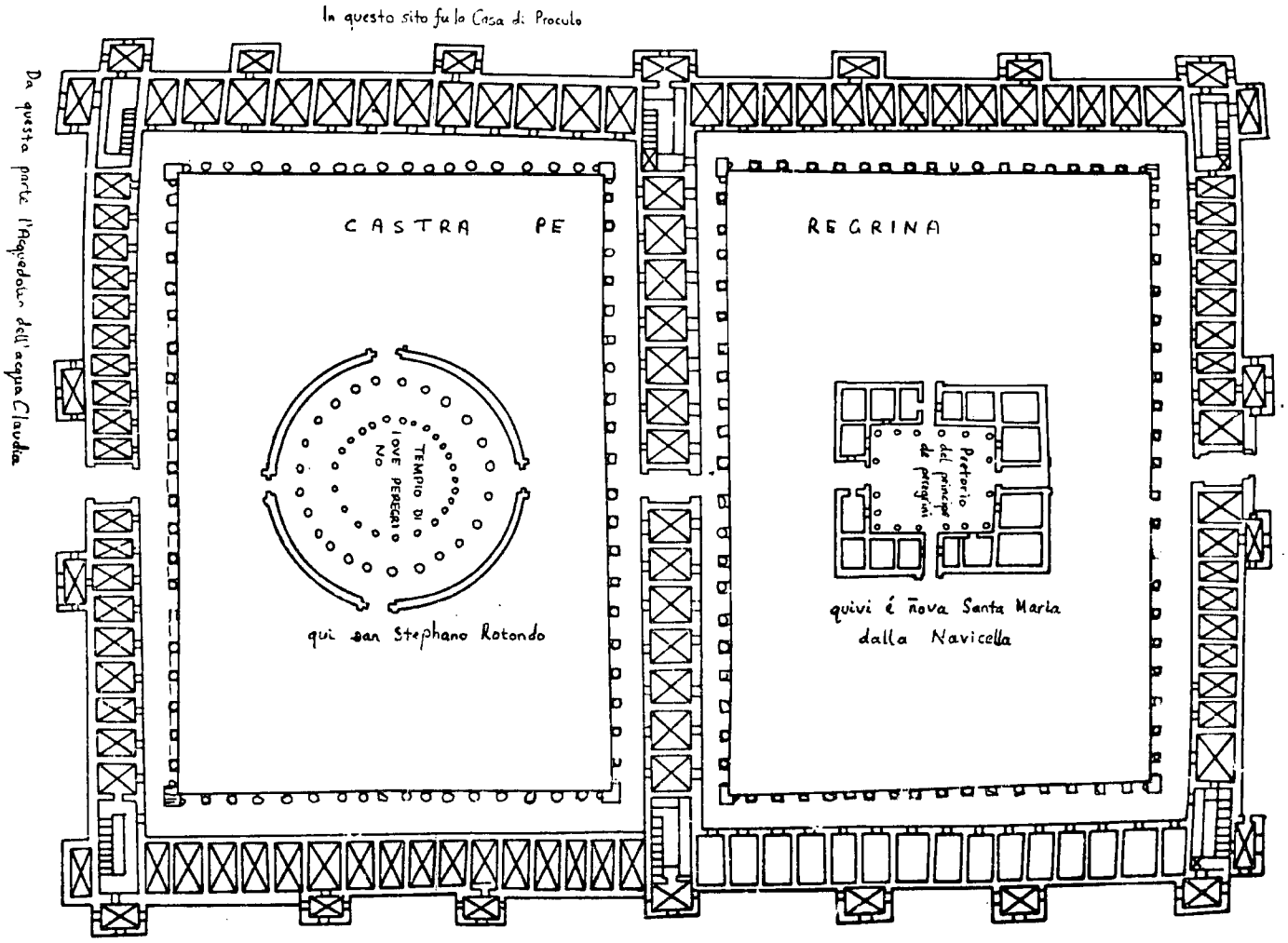


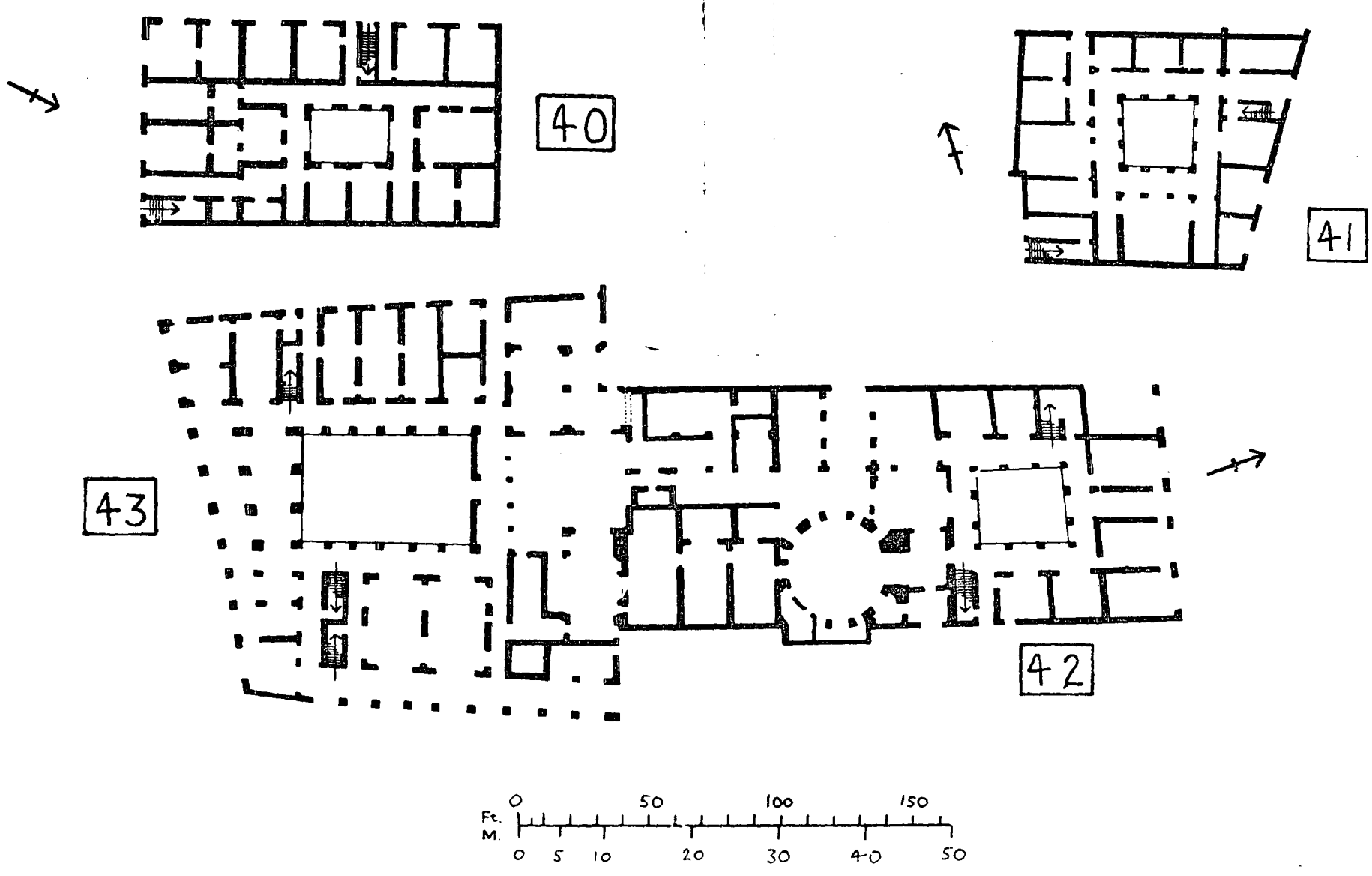
10 0 10 20 30 40 50 60 70 80 90 100
ROMAN FEET

5 0 5 10 15 20 25
METRES

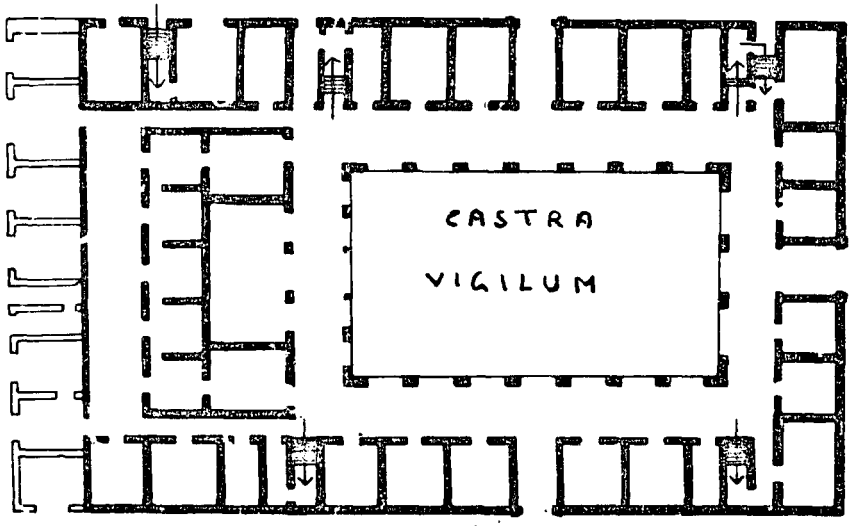
38

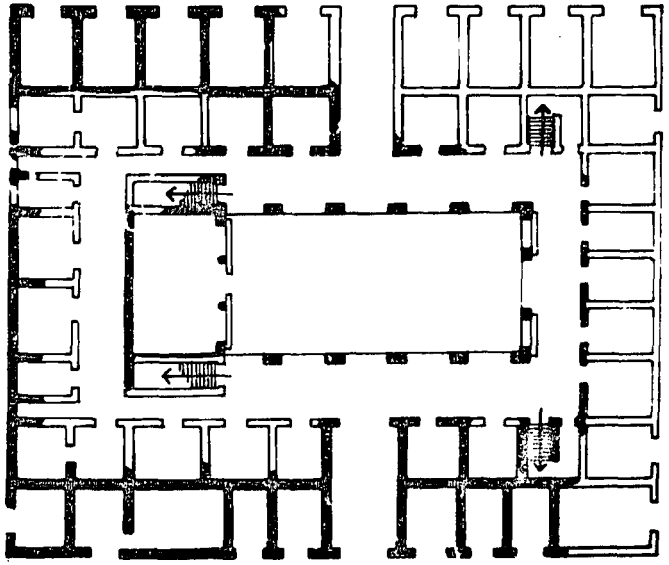
7.5.


In questo sito fu la Casa di Proculo
Da questa parte l'Aquedotto dell'acqua Claudia
CASTRA PE
REGRINA
IOVE PEREGRI
TEMPIO DI
NO
Pretorio
del principe
de peregrini
qui san Stephano Rotondo
quivi è Nova Santa Maria
dalla Navicella

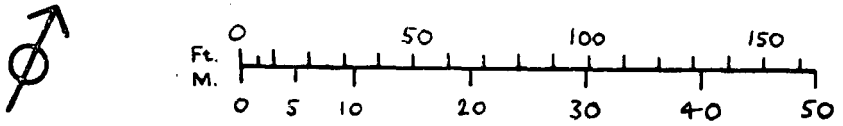

40
41
43
42
0
50
100
150
Ft.
M.
0
5
10
20
30
40
50

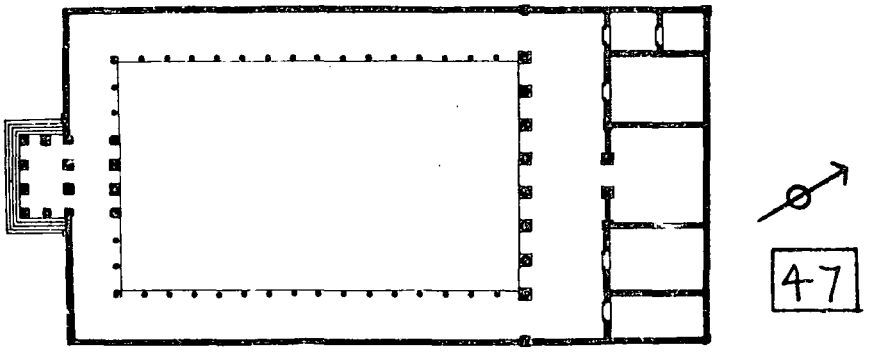
44
45
Ft.
M.
0
0 5 10
50
20
100
30
40
150
50



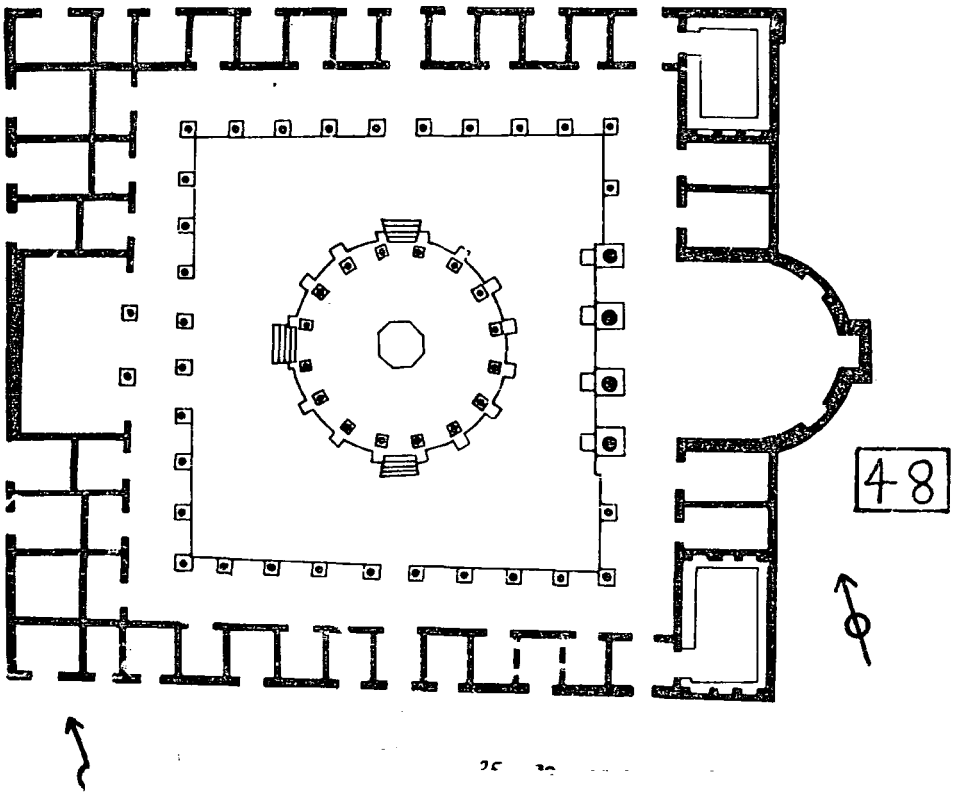


46

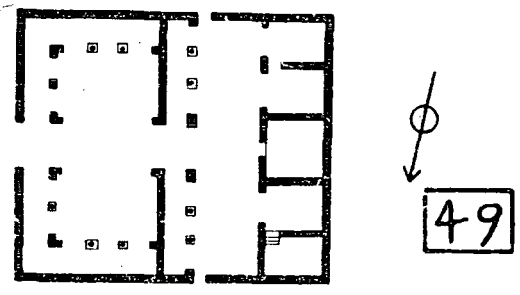




47



48



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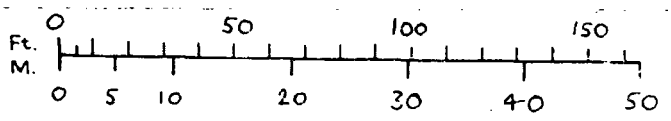

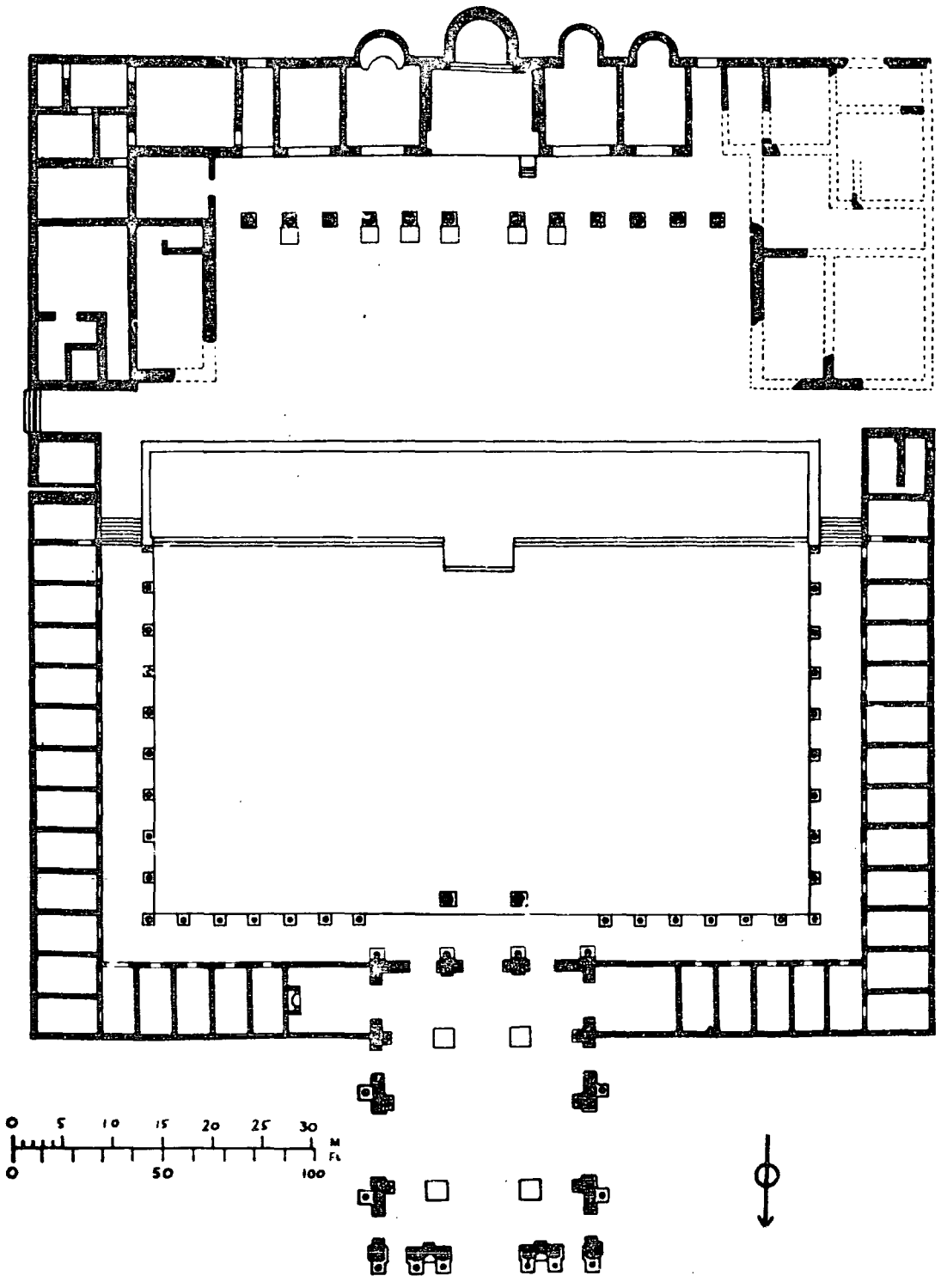

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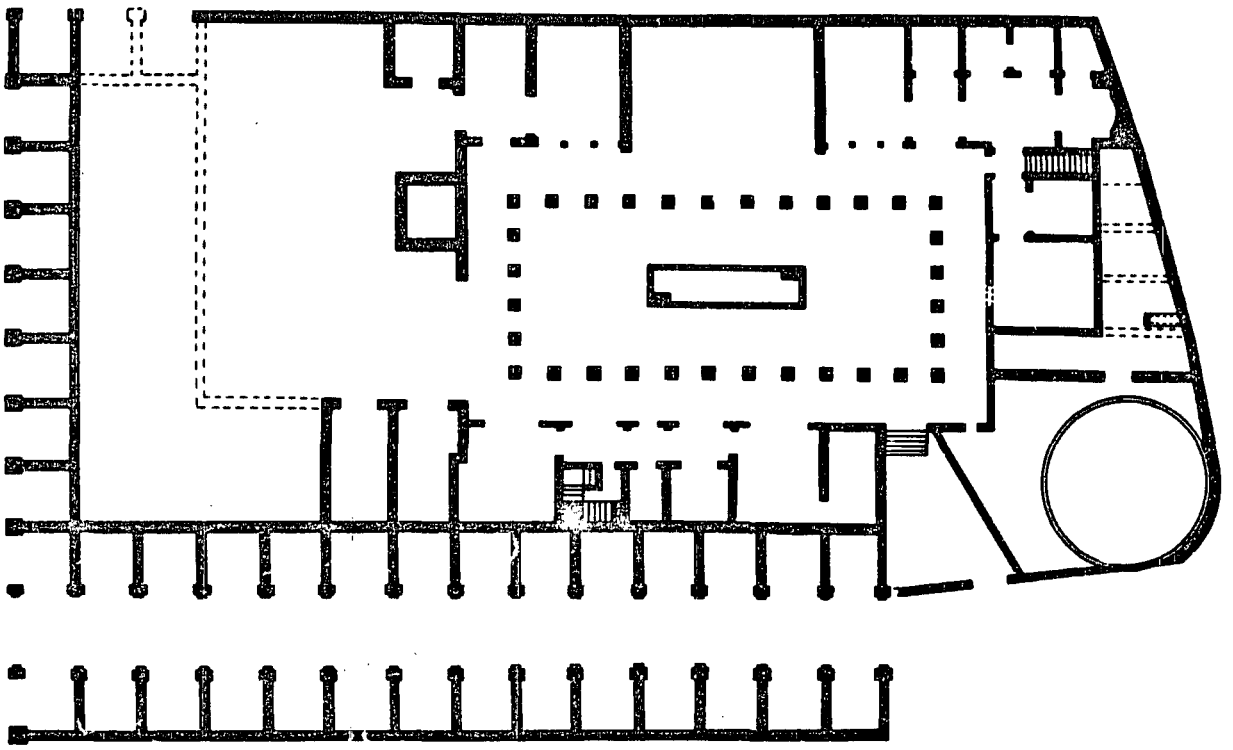

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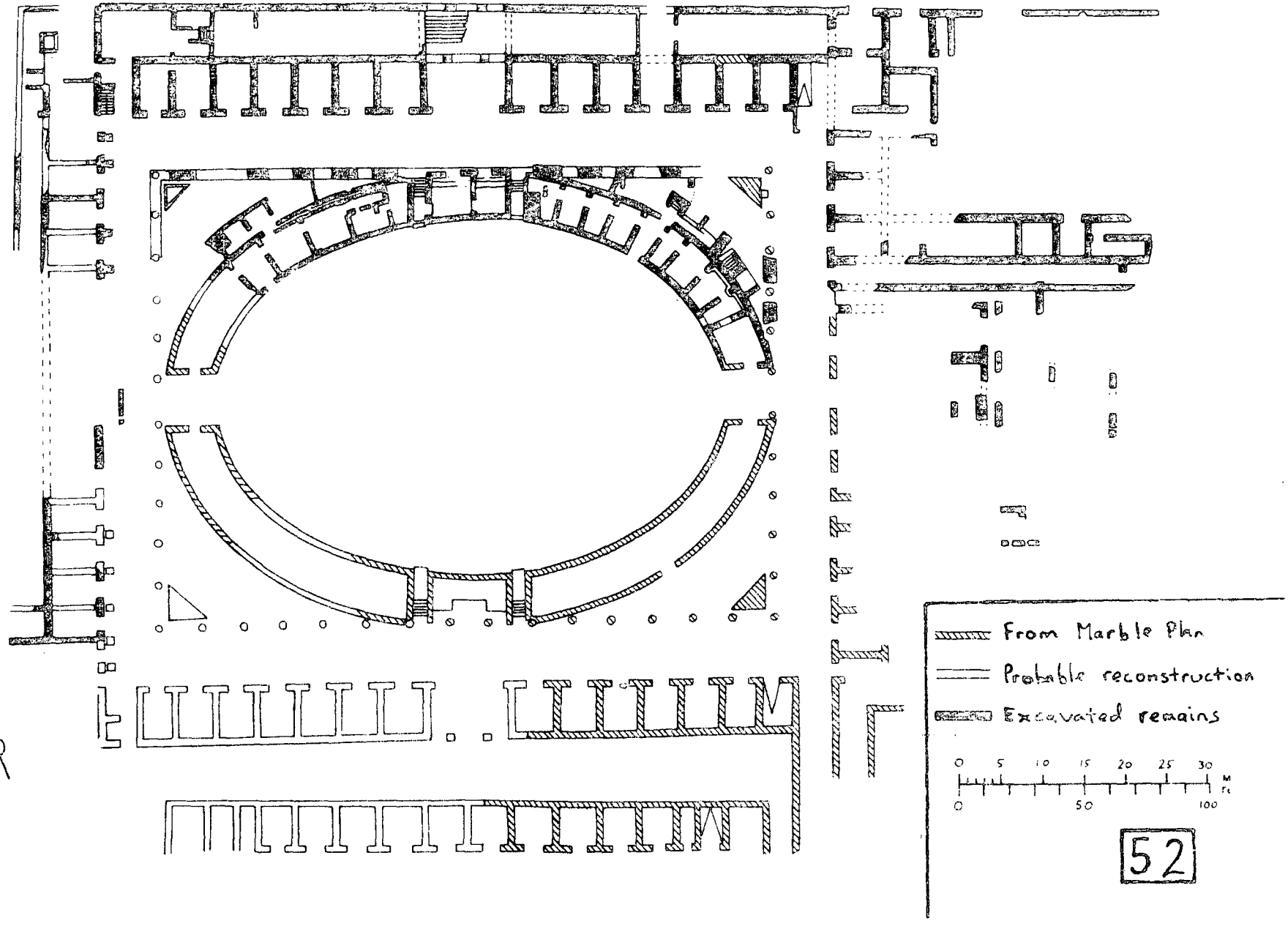
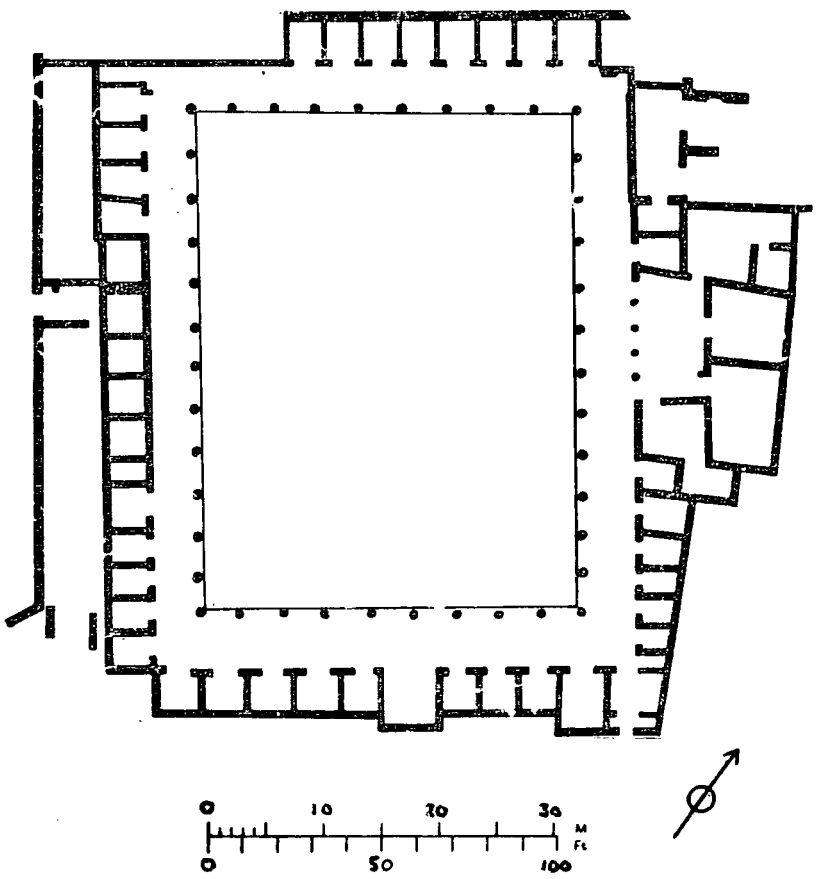

From Marble Plan
Probable reconstruction
Excavated remains
0 5 10 15 20 25 30
M
Ft
0 50 100



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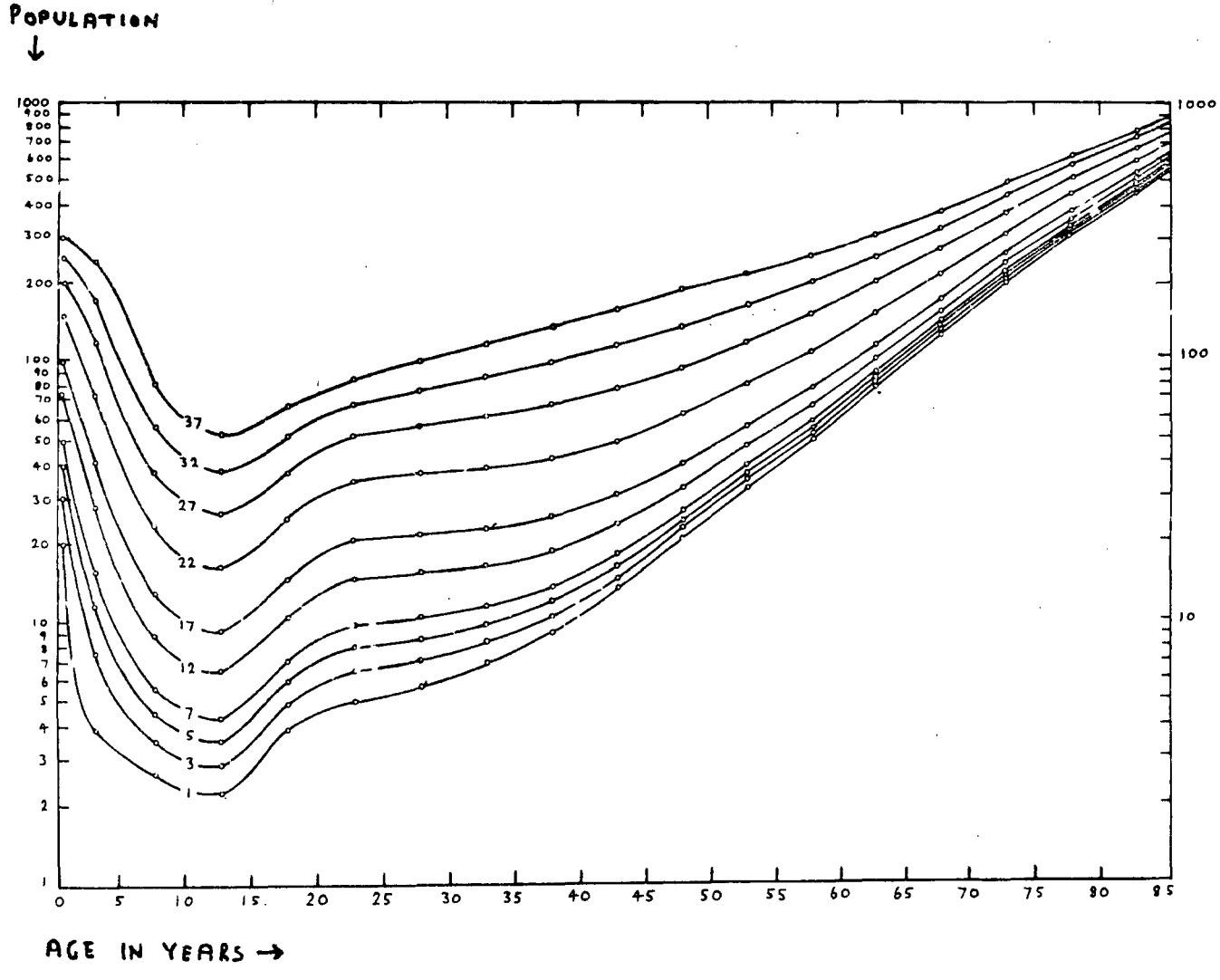
POPULATION
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1
37
32
27
22
17
12
7
5
3
1
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
AGE IN YEARS →