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Streets and streams : health conditions and city planning in the Graeco-Roman world

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Citation
Tilburg, C. R. van. (2015, October 14). *Streets and streams : health conditions and city planning in the Graeco-Roman world*. Retrieved from https://hdl.handle.net/1887/35894

Version:	Corrected Publisher's Version
License:	Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden
Downloaded from:	https://hdl.handle.net/1887/35894

Note: To cite this publication please use the final published version (if applicable).

Cover Page

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Title: Streets and streams : health conditions and city planning in the Graeco-Roman world
Issue Date: 2015-10-14

Overview of the Chapters

In this volume, six questions on the subject of infrastructure will be discussed: two concerning the infrastructures of cities, two of them will discuss the infrastructure of human bodies and their constituents, and two concern the relationship between city infrastructure and bodily health.

The most important similarity between both infrastructures is that both have to function in order to survive. No stream should ever be blocked or even hampered. If this does happen, the survival of body and city is endangered. If city waste cannot be discharged and is allowed to accumulate, people become sick – in the same way as vital organs become sick if within the human body congestion occurs. If a city (or state) is no longer accessible, the economy decreases and finally collapses, in the same way as a human being dies when air, food or fluids are no longer available.

To prevent traffic infarcts in the Graeco-Roman world, attempts were made, while leaving the infrastructure unchanged, to control traffic by means of the establishment of fixed routes. The majority of streets in Pompeii is only suitable for one-way traffic. Some thoroughfares allow return (two-way) traffic, but the blood vessel system allows only one-way traffic; Galen compared it to a garden irrigation system.[1] Later Roman towns, planned with a grid pattern, e.g. Xanten, were equipped with a larger infrastructure, able to cope with larger traffic flow, with more (and wider) city gates. Even compared to our modern roads today, the traffic-infrastructure in these settlements was very extensive.[2]

Ancient Xanten, however, did not survive as a large city – partly due to the Germanic invasions, but more importantly because the main approaching artery, the river Rhine, became silted up with sand because the city was situated on a convex bank.[3] The Dutch city of Nijmegen, close to Xanten, survived because this city was

1 Gal. *Nat. Fac.* 3.13 (2.187-189 and 197-198 K.).

2 See 'Traffic Policy and Circulation in Roman Cities', pp. 29-51.

3 When a river has an outside bend, the bank inevitably has a convex bank. People often speak of 'a

situated on an outside bend of the river Waal. More or less the same story applies to Tongeren and Maastricht: Maastricht arose as a city because the road system to Tongeren declined. The majority of cities which are nowadays in ruins were deserted by their inhabitants because the infrastructure was insufficient and trade started using other routes, e.g. in the case of Ephesus, Leptis Magna,[4] Dorestad and Bruges.

City gates play a crucial role. A city government could choose whether or not to build a defence system and if they did, they had to choose whether they wished to restrict the number of city gates and their passages, or not. A city equipped with many gates and wide passages was traffic-friendly but also vulnerable in times of war. A city with fewer gates and passages, on the other hand, was safer in wartime but there was more traffic congestion around the gates. However, even in the latter situation traffic always had to be in motion.[5]

Apart from their traffic infrastructure, Greek and Roman towns were equipped with two other types of infrastructure that played an important role: pipelines for the supply of fresh water and for sewage. Even more than in the case of traffic, strong similarities between city and body may be observed. City and body need a continuous supply of water. In a city, water flows through its own infrastructure, almost entirely invisible, in the Graeco-Roman world as well as in our modern cities. Only taps and fountains are visible, where the inhabitants tapped off their drinking-water. In the city, the quality and quantity of the fresh water supply and the maintenance of its infrastructure demand the permanent attention of the city authorities; physicians recommend the drinking of sufficient, high quality fresh water. Not only people but also cities can die from dehydration; the final collapse of Rome from the 6th century AD onwards was not only caused by the deterioration of the road system, but also by the aqueducts being demolished by the Ostrogothic king Totila.[6]

A similar situation arises with regard to the discharge of waste-products, particularly of faeces and urine. Much of this was recycled – in agriculture, industry and pharmacy – but the supply exceeded the demand. In the Graeco-Roman world the quantity of faeces must have been a problem, not only because of the stench, but also because of the amount of it. In Rome, wagons exporting excrement were exempted from the rule of driving in the city by day only. The discharge of faeces, in exiting the body as well as the city, was and is a crucial factor in keeping the quality of life under control.[7]

The theme of the last two chapters is the influence of city planning (including the infrastructure) on the quality of life. The first of these has a strong relation to the connection with the preceding chapter on faeces: it deals with the problems of city authorities confronted with the efficient discharge of human waste-products. Not

city, situated on a convex bank', but the river makes an outside bend. A comparable situation can be found in the case of Rotterdam and Schiedam, situated respectively along the outside bend of a river (bank convex bank) and a river convex bank (bank outside bend).

4 For silting up in Antiquity see Thommen 28-30.

5 See 'Gates, Suburbs and Traffic in the Roman Empire', pp. 53-81.

6 See 'Greek and Roman Ideas on Healthy Drinking-water in Theory and Practice', pp. 85-106.

7 See 'Opinions concerning Faeces and Urine in the Graeco-Roman World', pp. 107-133.

only in the Graeco-Roman world, but throughout history these problems had to be tackled. In the 19th century in many Dutch cities and villages there was a 'sewage collapse', e.g. in Gouda, where the canal water level was lower than in the neighbouring IJssel river, into which polluted canal water actually had to be drained. Faeces and other human waste were thrown into the canals, without restriction, endangering public health.[8]

Finally, the last chapter deals with the quality of life in a city in a meteorological context. In order for people to want to inhabit a city, it must be attractive: not only in socio-economic respect, but it should be situated also in a healthy and pleasant environment. Just as a human body, a city needs fresh air and sunshine, and both have to be able to withstand extreme temperatures and polluted air as far as possible. Not only nowadays but also in the Graeco-Roman world, city planning played an important role here. In Antiquity, buildings and even cities were sometimes badly planned, making them difficult to live in. In some exceptional cases, situations were improved, for instance through the measures taken by Terentius Varro to improve the health of patients in a sick-room. Cities as well as human bodies are likely to deteriorate from lack of sunshine or exposure to pollution, causing lowered resistance and even death.[9]

8 See 'A "Healthy Mistake": The Excrement Problem from Ancient Greece to Nineteenth Century Holland', pp. 137-157.

9 See 'A Good Place to Be: Meteorological and Medical Conditions in Ancient Cities', pp. 159-177.