

CHAPTER IX

OPERATION

Aequam memento rebus in arduis
Servare mentem.

HORACE (65-8 B. C.), *Odes*, ii. 3.

Remember to maintain a well-balanced mind
in the difficult affairs of life.

CHAPTERS 89-93 and 112-130 (the end) are taken up with a portrayal of the practical difficulties encountered in the operation of the waterworks of Rome, A. D. 97.

Whatever Frontinus may have lacked in knowledge of the laws of hydraulics, certain it is that he takes high rank, even to-day, as an administrator, or practical superintendent of waterworks. His own language describing the operation of the Roman waterworks is the best illustration of this.

9. "Near the intake of Julia is a brook called Crabra. Agrippa disdained to take in this brook, either because he did not consider it of good quality or because he thought he was under obligations to leave it for the use of the proprietors at Tusculum; for it is the same which is distributed by turns, on fixed days, and in determined quantities, to the estates of that part of the country. But without the same moderation, our water-men constantly drew upon the greater part of it for increasing the flow in the Julian aqueduct, though not for the purpose of increasing the discharge of this aqueduct, which on the contrary they exhausted, by diverting its waters to their own profit. I therefore cut off the Crabra Brook, and gave it again entire, upon the orders of the emperor, to them of Tusculum; who perhaps now get it with great astonishment on their part, and without knowing to what cause to ascribe the unusual abundance. The Julian aqueduct, on the other hand, has regained its normal quantity, and holds it even during notable droughts, by reason of

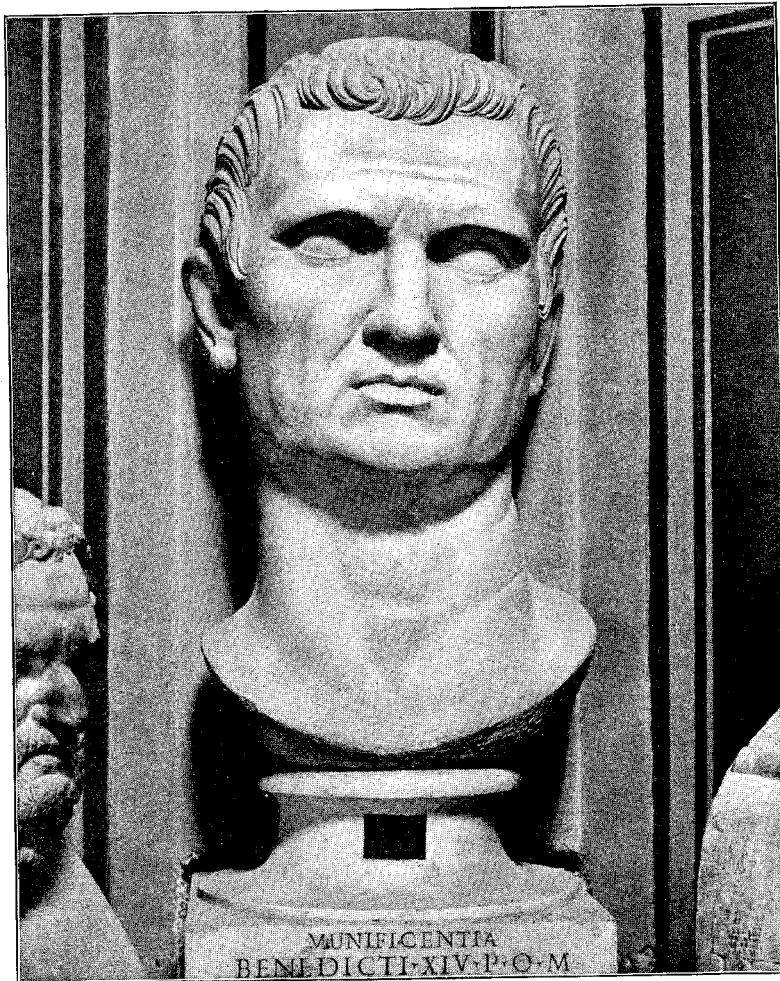
the destruction of the branch pipes, through which it was secretly despoiled."

87. "This is the schedule of the amounts of water distributed or available, down to the time of the Emperor Nerva (Trajanus). But now, by the foresight of the most painstaking of sovereigns, whatever had been unlawfully drawn by the water-men or had been wasted as the result of official negligence, has been recovered; this was practically equivalent to the finding of new sources of supply. And in fact the supply was almost doubled, and was distributed so carefully thereafter, that wards which had previously been supplied by only one aqueduct now received the water of several;" and so on, showing that this was done to keep all the wards supplied, no matter which particular aqueduct might, for the time being, be drawn for purposes of cleansing or repairs. For the same reasons, also, the running fountains were connected by lead pipes, each one generally with at least two delivery tanks, the two tanks being supplied by different aqueducts.

88. "The effect of this care displayed by the Emperor Nerva, most patriotic of rulers, is felt from day to day by the present queen and empress of the world; and will be felt still more in the improved health of the city, as a result of the increase in the number of the tanks, reservoirs, fountains, and water-basins. No little advantage accrues also to private consumers from the increase in number of private grants; and those who with fear drew water unlawfully, draw their supply now free from care, by grant from the sovereign. Not even the waste water is lost; the cleanliness of the city, too, is greatly improved; the air is purer; and the causes of the pestilence, which gave the air of the city so bad a name with the ancients, are now removed."

89, 90, 91, 92, 93 treat of a separation of the waters of the several aqueducts, in the uses to which they were put, by allotting them with reference to the qualities of each water. Some waters were mixed by reaching the city for part of the distance in one and the same aqueduct channel; "so that we have found even Marcia, so charming in its purity and coldness, used for baths, fulling-mills, and I may not say what vile appointments."

98. "The first permanent water commissioner was M. Agrippa (B. C. 34). He, as one might say, was commissioner mainly of works which he himself had called into existence. This was after his aedile-

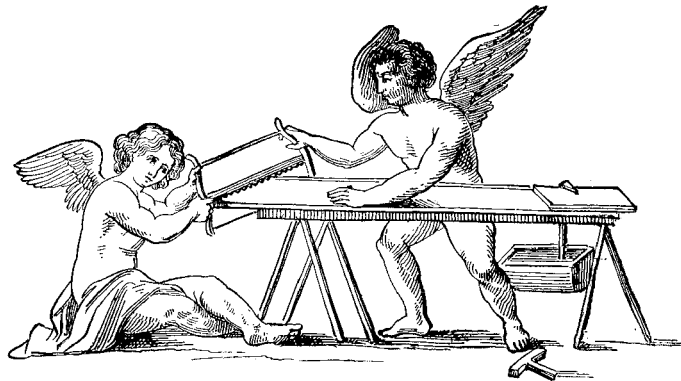


AGRIPPA (63-12 B. C.) SON-IN-LAW OF CAESAR *AUGUSTUS*,
AND HIS RIGHT-HAND MAN.¹

ship; and before his aedileship had come his consulship. Inasmuch as the amount of water now available warranted it, he determined how much should be allotted to the public structures, how much to the

¹ Perhaps the greatest of Roman builders. First *curator aquarum* of the city of Rome. The man who probably was the principal instrument for changing Rome "from a city of brick to a city of marble" during the reign of Augustus.

basins, and how much to private parties. He also kept his own private gang of slaves for the maintenance of the aqueducts and delivery tanks

CARPENTERS.¹

and basins. This gang was given to the State as its property by Augustus, who had received it in inheritance from Agrippa.”

This introduces us to the labor element of the operation of the waterworks.

BLACKSMITH.²STONE-CUTTERS.³

Of these slave bands there were two, — the one already mentioned, numbering two hundred and forty men, called those of the State ; and

¹ From a painting in Herculaneum.

² Blacksmith using the sledge-hammer; from the Virgil of the Vatican.

³ Stone-cutters (*lapidarius*) ; from the Virgil of the Vatican.

another (Chapter 116), called those of Caesar, established by Claudius (about 40 A. D.), numbering four hundred and sixty men. Many trades were represented among them, such as overseers, reservoir-keepers, line-walkers, pavers, plasterers, plumbers, masons, etc.

CARPENTER.²

They were managed from an office called the *Statio Aquarum*, referred to in Chapter 119, where Frontinus speaks, rather slightly to be sure, of the "builders in the employ of the office."

The office is also immortalized by an inscription on a lead pipe of one M. Marius Festus, who tells us that he belonged to the *Statio Aquarum*, the office of the water department.¹ Archaeological studies of tombstones, lead pipes, and other records have

revealed a wonderful list of employees of this office in addition to the chief engineer, superintendent, or sole water commissioner (the *curator aquarum*), such as the principal assistant, or deputy commissioner (*procurator*); several architects, by which term is meant a superintendent capable of directing any and all classes of workmen employed;³ several clerks, or secretaries; two lictors, or special policemen; some public criers and orderlies; and two bands of slaves. These last included a foreman, a water-registrar, a lot of levellers, notebook-keepers, reservoir-keepers, pavers, line-walkers, plasterers, and other workmen. To illustrate what a learned and diligent seeker after

MASON.⁴

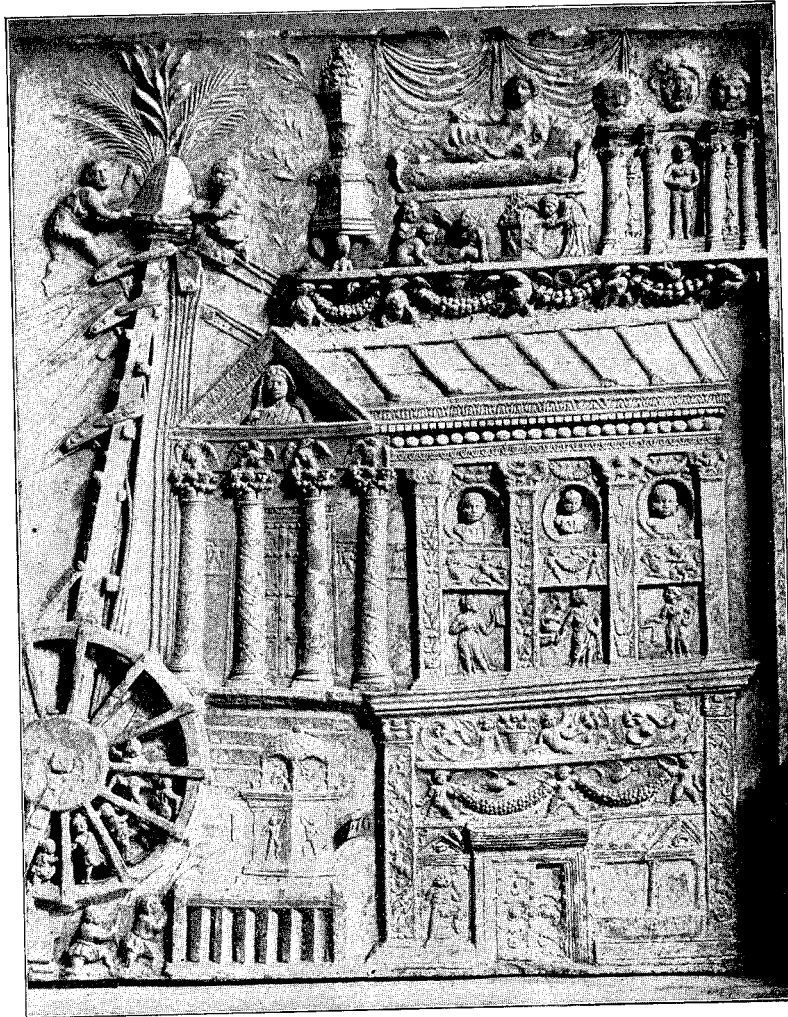
¹ Lanciani, *Frontino*, p. 530.

² From a Gallo-Roman tomb.

³ In the course of time some of these became "hydraulic" architects, others military engineers, and these again separated into civil and military engineers.

⁴ From Trajan's Column.

such information, working with the enthusiasm of youth, can accomplish, it may be mentioned that Lanciani gives the names and partial history of sixteen *curatores aquarum* who came after Frontinus,



ROMAN DERRICK.¹

besides giving information about the seventeen named by Frontinus as having preceded him, and gives also the names, and other data concerning them, of forty-two deputy commissioners who lived from Tiberius to Diocletian, a period of two hundred and seventy years.

¹ Lateran Museum. Note the small boys in the tread-mill that winds up the "fall."

We touch now upon a characteristic of the times we are considering, the presence of slave labor, and, moreover, in its most debasing form, namely, that in which master and servant are of the same race.



TOMBSTONE. 1

To the American of mature years, but who can remember what this country was like in the late 'forties or early 'fifties, to one who has seen negroes sold at auction, and who lived as a youth through the

¹ Tombstone of a Roman architect of the time of Frontinus in the Galleria Lapidaria of the Vatican. From a photograph taken for the author. Note the lock on the side of the monument, emblematic of the profession of an architect. On the other side, see p. 249, is a square.

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