

early (well before the time of the earliest surviving MSS and papyri), it seems reasonable to conclude that a better understanding of the early textual history of the Vergilian corpus (as well as that of other Latin authors) can be obtained only by accepting the fact that cursive scripts were used in the early stages of the transmission of the text.

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THE LOW BIRTH-RATE IN ANCIENT ROME: A POSSIBLE CONTRIBUTING FACTOR

There is considerable evidence to show that Roman society in the late Republic and early Empire was afflicted by a low birth-rate. Augustus in 18 B.C. found it necessary to pass the *lex Iulia de maritandis ordinibus* in the hope of raising the birth-rate by penalizing the unmarried and the childless. In 9 A.D. he attempted to supplement this law with the *lex Papia Poppaea*. The very existence of this legislation indicates that the problem of childlessness was widespread and long-lasting, a view which is further supported by references to this subject in Latin literature¹).

A number of theories have been put forward by scholars to explain this fact. Among these are the notion that Romans prac-

1) Augustus's attempt to raise the birth-rate did not lack precedent in Roman history. Valerius Maximus tells the story that the censors Camillus and Postumius, as early as 403 B.C., had fined elderly bachelors for failing to marry and sire children (Val. Max. 2.9.1) and Metellus Macedonicus, censor in 131 B.C., made a speech urging men to marry and procreate, which was read out to the Senate by Augustus in support of his own legislation (Suet. Aug. 89.2). However it seems unlikely that Augustus's attempts to solve the problem were very successful. Tacitus states explicitly that they were not (Tac. Ann. 3.25) and in view of the fact that the Augustan legislation was reinforced by Domitian and re-enacted in the second and third centuries A.D. it seems that the low birth-rate continued. Jones disagrees with this view and argues that there was a slow but appreciable increase in the birth-rate following Augustus's legislation (A.H.M. Jones, *Augustus* [London 1970], p. 136). Nevertheless there is considerable evidence for the existence of marriages which produced no children at all or only one child, as Balsdon shows (J.P.V.D. Balsdon, *Roman Women* [London 1962] pp. 194 ff.).

tised contraception and abortion to avoid the birth of unwanted children²), that members of the upper classes suffered from a form of dysgenic lead poisoning caused mainly by the use of lead cooking vessels, which rendered many of them sterile³), and that a form of natural selection in favour of infertility took place, due to the common practice among noble males of trying to marry heiresses who were the sole children of their families and therefore likely to demonstrate low fertility in their turn⁴). Any or all of these practices may have been genuine contributing factors to the low birth-rate in Rome. However it is the contention of this paper that a far more significant contributing factor to the low birth-rate was the Roman practice of taking very hot daily baths.

Modern medical research has shown conclusively that exposure to heat has a detrimental effect on male fertility. As early as the end of the nineteenth century it was generally recognized that testes which remain undescended ('cryptorchid' testes) are almost invariably sterile⁵). Piana and Savarese in 1891 showed that when the scrotal testes of rats were pushed into the abdomen and retained there surgically they atrophied⁶). They attributed this effect of cryptorchidism to the higher temperature in the abdomen. In 1923 Fukui⁷) and Moore⁸) independently showed that similar changes could be produced by locally heating the testis. It has been found that temperatures above 98.6 °F (normal human body

2) The use of contraception by the Romans is discussed in K. Hopkins, *Contraception in the Roman Empire: Comparative Studies in Society and History* 8 (1965), 124-151 and S. Pomeroy, *Goddesses, Whores, Wives and Slaves* (New York 1975), pp. 166 ff. Most of the contraceptive techniques used by the Romans (such as wearing an amulet made from a spider's head [Pliny N.H. 29.85] or inducing sneezing after intercourse [Soranus 1.61]) must have been singularly ineffectual. Occlusive agents such as oil and honey, used to block the os of the uterus, may have had greater success, but it seems unlikely that contraception played a large part in causing the low birth-rate. Abortion was certainly practised, as Ovid attests (Ovid, *Amores* 2.13 and 14) and was, predictably, hazardous. It may have contributed to the population problem by killing mothers as well as foetuses.

3) S. C. Gilfillan, *Roman Culture and Dysgenic Lead Poisoning: The Mankind Quarterly* vol. 5, no. 3 (January - March 1965), 3-20.

4) H. M. Last, Letter to N. H. Baynes: *JRS* (1947), 152-6.

5) B. P. Setchell, *The Mammalian Testis* (London, 1978), p. 360.

6) G. P. Piana and G. Savarese, *Su alcuni studii anatomo-patologici: La Clinica Veterinaria* 14(1891), 50-51.

7) N. Fukui, *Action of body temperature on the testicle: Japan. Med. World* 3 (1923), 160-3.

8) C. R. Moore and H. D. Chase, *Heat application and testicular degeneration: Anat. Rec.* 26 (1923), 344-5.

temperature) have effects of this kind in most mammals and that the higher the temperature the shorter the exposure needed to cause testicular damage and subsequent lowering of fertility⁹). It has also been shown that repeated applications of heat produce progressive damage¹⁰).

There can be little doubt that the baths enjoyed by the Romans were very hot and very frequent. According to Pliny the Elder (Pl. N.H. 36.121) the census of baths taken by Agrippa in 33 B.C. showed that there were 170 baths in Rome and this number undoubtedly increased with time. It is common knowledge that Romans, even of the lower social classes, were in the habit of taking daily baths and some seem to have bathed even more frequently (Petronius, *Satyricon* 72). The usual routine¹¹) for a bather was to play a game of ball in the *sphaeristerium* to warm up before entering the *tepidarium* where he would sweat for a while with his clothes on. He would then undress in the *apodyterium* and be anointed with oil. After this he would sweat profusely in the *caldarium* and even more profusely in the *laconicum*, which was directly over the hypocaust. The next step would be to have warm, tepid and finally cold water poured over him, after which he would be scraped with a strigil and sponged. He would end his bath with a cold plunge in the *frigidarium*.

For the purposes of this paper the time spent in the *caldarium* and the *laconicum* is the most significant part of this routine. It has already been pointed out that temperatures over 98.6 °F can cause testicular damage and, while it is difficult to establish the exact temperatures which would have been reached in these parts of the baths, they would certainly have been higher than this. The hot springs at Bath, used in the Roman baths, have a natural temperature of 120 °F¹²), while a sauna, which is probably the closest modern equivalent to a Roman *caldarium*, reaches temperatures of 200 °F or higher – sufficient to destroy all but the hardiest spermatozoa.

Evidence from ancient authors confirms the impression that the baths of the early Empire were sweltering fire-boxes in which

9) Ibid.

10) K. Bowler, The effects of repeated temperature applications to the testis on fertility in male rats: *J. Reprod. Fertil.* 14 (1967), 171–3.

11) The details of this routine probably varied somewhat. Carcopino gives a good basic outline of it in *J. Carcopino, Daily Life in Ancient Rome* (New Haven 1940) p. 284.

12) L. Wright, *Clean and Decent* (London 1960), p. 19.

the Romans were regularly parboiled. The most vigorous critic of this institution is the Younger Seneca. He speaks of the marble-lined pools (Seneca, Ep. 86.6): *in quas multa sudatione corpora exinanita (exsaniata codd.) demittimus* ('into which we lower our bodies when they have been exhausted by abundant perspiration'). Later in the same letter he contrasts the moderate temperature of the baths of early times with (Seneca, Ep. 86.10): *hanc, quae nuper inuenta est similis incendio, adeo quidem, ut conuictum in aliquo scelere seruum uiuum lauari oporteat. Nihil mihi uidetur iam interesse, ardeat balineum an caleat* ('this recently invented heat, resembling a conflagration, to such an extent indeed that a slave convicted for some criminal offence ought now to be bathed alive. Nowadays it seems to me that there is no difference between a hot bath and a bath on fire').

Seneca was not the only writer to complain about the searing heat in the baths of the early Empire. Martial also refers to it (Martial, Epigrams 6.42) and the Elder Pliny includes in his indictment of evil influences which have ruined the morals of the Empire (Pliny, N.H. 29.26): *balineae ardentes quibus persuasere in corporibus cibos coqui ut nemo non minus ualidus exiret, oboedientissimi uere efferrentur* ('scalding baths by which they [sc. 'doctors'] have persuaded us that food is cooked¹³) in our bodies, so that everybody goes out of them weaker and the most submissive are carried out').

Seneca and the Elder Pliny may be exaggerating slightly out of moral zeal, but a passage from the letters of the Younger Pliny seems to corroborate the substance of their statements. In describing the murder of Larcus Macedo by his slaves, Pliny points out that the slaves were able to pretend plausibly (though deceitfully) that his collapse had been caused by the heat of his bath (Pliny, Ep. 3.14). If the Roman baths were hot enough to cause fainting and fatigue, they were probably hot enough also to cause chronic low fertility among males.

Precise statistics on the birth-rate in ancient Rome are impossible to obtain and the problem is further complicated by the difficulty of determining how many people remained childless by choice. However two examples of well known Romans who seem to have suffered from low fertility in spite of their earnest desire for offspring, while proving nothing in isolation may

13) This is presumably a pun on *concoquere* (or sometimes just *coquere*), meaning 'to digest'.

perhaps be indicative of a general trend. The emperor Augustus, who according to Suetonius (Suet., Aug. 82) pampered his health by taking sweat baths, in the course of three marriages¹⁴) was only able to father a single child. Similarly the Younger Pliny, whose fondness for hot baths can be inferred from several passages in his letters (Pliny, Ep. 2.17.26, 5.6.25, 7.16, 7.21.3) remained childless through three marriages¹⁵). Other examples could be adduced, particularly from among the Emperors¹⁶).

The baths must have made an enormous contribution to the welfare of the Romans through their encouragement of hygiene and regular exercise and their usefulness should not be undervalued. Yet even in ancient times they were thought to have their dangers and these hazards may not have been limited to the possibility of moral corruption or sudden death¹⁷). In the light of modern medical evidence it now seems likely that they also included quite a strong risk to any man's chances of eventually obtaining the *ius trium liberorum*.

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14) However the first of these was not consummated, according to Suetonius (Suet., Aug. 62).

15) Pliny's third wife Calpurnia had a single pregnancy, ending in miscarriage (Pliny, Ep. 8.10 and 11). He makes no reference even to such slim hope of children as this from his previous marriages.

16) Nerva, Trajan, Hadrian and Commodus all died childless. Interestingly enough, Hadrian's fondness for attending the public baths is attested by his biographer (SHA, Had. 17.6), while Commodus was actually strangled in his bath. His assailants might have had difficulty finding him anywhere else – he is said to have taken seven or eight hot baths per day (SHA, Comm. 11.5).

17) Unsavoury loiterers such as vulgar food vendors and procurers seem to have lurked at the baths (Seneca, Ep. 56.2, Martial, 12.19) and Juvenal predicts a fatal heart-attack for gluttons who waddle into the baths after gorging (Juv., Sat. 1.143–4). Some Christians also disapproved strongly of the baths because of their lewd reputation and warned their brethren away from them. Jerome, for instance, speaks approvingly of women whose virtue is indicated by their filth (Jerome, Ep. 45.3).