“ANOTHER DAY, ANOTHER DENARIUS”

“ANOTHER DAY, ANOTHER DENARIUS”: ROMAN *STIPENDIUM* AND INFLATION

By H. TOMPKINS TRIPP IV, B.A.

A Thesis Submitted to the School of Graduate Studies in Partial Fulfilment of the Requirements for the Degree Master of Arts

McMaster University MASTER OF ARTS (2023) Hamilton, Ontario
(Classics)

TITLE: “Another Day, Another Denarius”: Roman *Stipendium* and Inflation
AUTHOR: H. Tompkins Tripp IV, B.A. (McMaster University)
SUPERVISOR: Doctor Martin Beckmann NUMBER OF PAGES: vii, 143

Lay Abstract

This master's thesis looks at how Rome paid its soldiers and the impact of this payment on its economy. The research will help our field to explore how soldiers were paid, where the money came from and how these payments to its vast military operations impacted Rome's inflation during the Republic and Augustan and Flavian periods of the early Empire. The author uses numismatic evidence in a unique way to support his arguments on issues including the costs of paying the army, the use of the denarius as the government's standard currency and the impact on the economy of such massive payments, including its association with debasement, inflation and the bi-metallic standard. In each chapter, the author looks at the socioeconomic impacts of these issues on the soldiers, especially the foot soldiers, and asks the question of how Rome valued its army.

Abstract

This master's thesis looks at how Rome paid its soldiers and the impact of this payment on the Roman economy. The research will make a significant contribution to the classics field in its focused exploration of how Roman soldiers were paid, the payment sources and how these payments contributed to the Roman Empire's vast military operations. This thesis will further analyze how the payment of soldiers impacted Rome's inflation during the Republic and Augustan and Flavian periods of the early Empire.

The author uses numismatic evidence to support his arguments. In chapter 1, the author uses research by Duncan-Jones and Michael Crawford's hoard evidence to support the line of inquiry on how much it cost to pay the Roman army. In chapter 2, the author argues for and provides support on using Dutch excavation findings to illustrate the types of coins used and when they were used to pay the Roman military. Previously, scholars relied on excavations in German forts along the main part of the Rhine for such evidence. The author's use of numismatic evidence in this unique way provides further support that the use of the denarius was the government's standard currency. He includes pictures of similar coins from the McMaster Museum of Art's Bruce Brace Coin Collection to help the reader visualize the currency. Finally, in chapter 3, the author looks at the economic impact of such massive payments to pay Rome's ever-expanding army. There, he uses numismatic evidence to look at issues of debasement, inflation and the bi-metallic standard. Again, he returns to the Dutch fort excavations for additional evidence on debasement.

In each chapter, the author looks at the socioeconomic impacts of these issues on the soldiers, especially the foot soldiers, and asks the question of how Rome valued its army. From this thesis, readers will gain insight into how paying the military negatively impacted Rome's economy. The inflation that resulted had a significant impact on Roman culture, and this thesis focuses on the specific impact on Roman soldiers.

Acknowledgements:

Much gratitude to my thesis committee chair, Dr. Martin Beckmann, for all of his valuable wisdom on this project and over the past two years. Thanks, too, to Dr. Claude Eilers, for his help in translating the ancient Greek and other issues of epigraphy. Last, but in no way least, innumerable thanks to Dr. Pope for giving me the online keys to the McMaster Museum of Art's Bruce Brace Coin Collection and for all of his patience in answering my questions about ancient Rome and modern Canada.

Table of Contents

INTRODUCTION

When touring Herculaneum and its museum in 2022, I saw an exhibit on one of the skeletons uncovered at the old waterfront site that was identified as a soldier. According to the exhibit, this determination was based in part on some fancy armor decorated with precious metals and a fancy shield found near his body which is associated with the praetorian guard. More intriguingly, he was found with a bag of carpentry tools and a bag of coins. The coins were fused together because of the heat from the pyroclastic surge, but they were identified as twelve denarii and two aurei (Jarus, 2021). According to the museums' exhibit, researchers used numismatics for additional support of their identification claiming that the coins were the equivalent of one month of a praetorian guard's monthly salary. The exhibit made me wonder what Roman soldiers were paid and what those pay scales might tell us about Roman society. Beyond that, I wondered how numismatics could help support our knowledge of ancient Roman military pay scales. Thus began an exploration of these two concepts. In this master's thesis I look at how Rome paid its soldiers and the impact of this payment on the Roman economy and culture and provide numismatic support.

Some background on Rome's history of paying its troops helps to segue into these issues. Originally, in the earliest days of the Kingdom and early Republic, Roman soldiers were not paid. Soldiers had to purchase their own equipment and supplies at their own expense. Aware that poor Romans could not afford this, the government initially determined what class of the army a soldier would serve in based on the government's determination of the total value of the soldier's property through Rome's census. The poorest of the poor who did not own any property were exempt from service. Around the time of the second Punic War, Rome realized it had to pay its soldiers because the nature of warfare had changed; it was now on a greater geographical

scale. Originally, campaigns were mainly short wars with Rome's neighbors over farmland or natural resource deposits, to steal money or, because it was ancient Rome, to get revenge for a perceived insult. By the time of the Punic Wars this had changed dramatically. Often wars were located at greater distances from the soldiers' homes. Thus, the role of soldiers changed from serving a few months during the year and returning home to work on the farm or earn other income, to serving year-round. In addition, due to manpower shortages and supply problems, Rome realized that the original model was not working, and started to pay soldiers during the Second Punic War. During the Jugurthine Wars, Rome implemented the Marian reforms to completely overhaul the army. This involved eliminating the different classes of the army from the old system. By this time, Rome needed even more soldiers, so it started to enlist the lowest class of the census, those without property, or the *capitecensi*. Also, as part of the reforms, the Roman government increased soldiers' pay and started to supply their equipment. It also gave everyone basically the same equipment, including a gladius sword and then the scutum shield and a new kind of armor. By the time of Rome's civil wars, Rome had over a century of professional soldiers and Rome was treating them as such by paying and supplying them. My thesis begins at this point in history when I explore what these professional soldiers were paid and trace the history of pay raises and other compensation.

In chapter 1, I explore how much soldiers were paid from the mid-Republic to the late Empire, up to the end of the Third Century AD and the beginning of the Fourth Century AD. I begin by looking at the scholarship on the literary evidence on Roman military pay scales. Then, I introduce seven pieces of documentary evidence commonly relied on for rates of individual pay and one for collective pay. Curiously none are from the city of Rome, but mostly from Egypt and one from Syria, Judea and Switzerland. M. A. Speidel's analysis of this evidence is persuasive on

the lower salary scales for the legionaries, especially for the First and Second Century. I add new scholarship to help support these pay scales, including a recently translated papyrus from Egypt, P. Harris, which suggests a pay amount found on Speidel's pay scales. Speidel's pay scales are strongest for the legionary salaries and auxiliary and officers pay scales lack much documentation making them less certain.

Collectively, this evidence tells us about some things about Roman culture. It showed that income inequality was worse between the enlisted and the officers. The evidence also suggested that many soldiers received no money from their pay after repayment for supplies. It showed that a foot soldier's pay was more of a paper transaction than an actual transfer of money to the soldier. This was the result of the government charging soldiers for their every supply and deducting it from their pay before any money was transferred to them. I interpreted this evidence to suggest that at some periods the Roman government acted like the "company store" where soldiers were beholden to the government to receive their supplies at above the state's cost.

I was surprised at how little of this evidence existed on Roman pay scales. Even accepting the scholarship on individual pay rates, without strong records on the number of soldiers to pay it still did not help to answer my question—what was the impact of Rome's paying its military? I adapted my inquiry to include what it cost Rome to pay its soldiers collectively. I used Duncan-Jones' budget estimates and Michael Crawford's coin hoard evidence for an answer. Both researchers were determining Rome's total budget, but both conclude that Rome paid its military tens to hundreds of millions of denarii a year. Duncan-Jones relies on Speidel's documentary evidence and Cassius Dio's literary evidence as support for this budget during the Empire. In contrast, Crawford looks at some hoards to try to determine if the Roman government made coins only for state expenditures during the Republic. He concludes that the

government was making coins for paying the army with little comparative surplus to use for other state expenses. Based on this, Crawford estimates the total cost of paying and supplying the army which went from about five million denarii a year to tens of millions of denarii as time got closer to the beginning of the Empire. Both scholars' conclusions were helpful to support my line of inquiry on how much it cost to pay the Roman army as a whole with the conclusion that such payments were massive.

In chapter 2, I look at the type of currency that Rome used to pay its soldiers during this period and explore the line of inquiry that soldiers were paid in denarii. I begin with a general overview that includes what coins Rome minted and where they were made. During the time of Augustus, the denarius became the most important coin of his new currency system. According to Kenneth Harl, Romans even used it to pay their taxes. His research suggests that when the Roman army used the denarius to pay the military, it helped to spread it all over the empire. I include some literary evidence that also supports that Rome paid its military in denarii, including references from Suetonius' *Lives of the Ceasars* and Cassius Dio's *History*. I also look to the earlier-mentioned documentary evidence, including the Vindonissa tablet that refers to the 50 denarii that a cavalryman received in his pay with a reference to 75 denarii in the next. Beyond the traditional evidentiary support, I argue for and provide support on using Dutch excavation findings in a novel way to illustrate the types of coins used and when they were used to pay the Roman military. Previously, scholars relied on excavations in German forts along the main part of the Rhine for evidence on other theories involving the Roman military. I use numismatic evidence in this unique way to provide further support that the denarius was the government's standard coin. The Dutch site is particularly useful because it consists of a legionary fort and another site for the camp followers. This helps to support my line of inquiry as to whether silver

was used by the government to pay the military and bronze was used for general commerce. The numismatic evidence showed that the legionary fort site tended to have more silver and even gold coins in it and the camp followers' site had more bronze. Additional support for my theory was provided because this trend stopped when the legion moved on and abandoned the fort. In addition to this numismatic research from Fleur Kemmers, I also use coins from McMaster's Bruce Brace Coin Collection to help to create a visual of the numismatic record in this paper's Appendix.

Finally, in chapter 3, I look at how Rome's massive payments to the army impacted its economy, including inflation. I define inflation as a negative impact on the consumer's ability to purchase items because of price increases. To give the reader some background, I begin with a short primer on Rome's economy, including a timeline of periods of inflation. I support this with Richard Duncan-Jones' research on inflation based on the cost of a donkey in Roman Egypt and Alfred Wassink's similar analysis by creating a "general price index." I use the US Federal Reserve's principle that inflation occurs when the money supply grows faster than the economy's ability to produce goods and services. Then, I lay out the evidence of how paying the army contributed to inflation. I then use the scholarship to show that paying its army was one of Rome's largest if not the largest expense, amounting to tens to hundreds of millions of denarii. I argue that injecting this multi-million denarius payment into the economy impacted inflation and use the scholarship to show a correlation to support it. I further support this by examining the correlation between military pay raises and periods of inflation. I also look at how increasing the size of the army (and hence making a larger payment) impacted inflation.

Yet, my original hypothesis that paying the military was the driver of inflation was disproven in part by my subsequent research on debasement. Based on research by Wassink and

Kevin Butcher and others, I found that the reason why the Roman government debased the currency was to make up for large expenditures like paying the military. Thus, debasement was the catalyst for Rome's inflation. To support this, I look at the amount of silver used in denarii in different periods of time and compare that to the concurrent levels of inflation. I again use numismatics by returning to Kemmers' research on Rome's use of debasement and tie it to the inflation timeline. I conclude that it was inversely proportional in that inflation was higher when the amount of silver in the denarii was lower. I argue that because we have better records on silver content and thus debasement than on inflation during the Roman Empire, then debasement is perhaps a better indicator of the relationship between the impact of paying the army and inflation. My original theory that paying the military was the driver of inflation was further weakened by the research that showed that debasement was also used so that Rome could maintain its bi-metallic standard with a ratio of 25 silver coins to one gold coin.

Throughout, I look at how these issues reflect Roman culture. For example, I look at the socioeconomic impacts of these issues on the soldiers, especially the foot soldiers, and ask the question of how Rome valued its army. I also argue that debasement was in some ways symbolic of Roman society. I agree with Kenneth Harl that public trust inside the Roman state was what determined the success of Roman coinage.

While scholars have examined some of these issues surrounding Roman soldiers' pay, there is no current research that synthesizes all of these arguments in a comprehensive analysis. Moreover, the evidence that supports the answers to these questions of how Roman soldiers were paid is surprisingly scarce. Scholars that have researched the subject have not all agreed on the conclusions or what those conclusions help illustrate. My research will make a significant contribution to the classics field in its focused exploration of how Roman soldiers were paid, the

payment sources and how these payments contributed to the Roman Empire's vast military operations. This thesis further analyzes how the payment of soldiers impacted Rome’s inflation during the Republic and Augustan and Flavian periods of the early Empire. Throughout, I use numismatic evidence to support these arguments and often use it in an innovative way. From this thesis, readers will gain insight into how paying the military negatively impacted Rome’s economy. The inflation that resulted had a significant impact on Roman culture, and this thesis focuses on the specific impact on Roman foot soldiers.

CHAPTER 1: ROMAN SOLDIERS' PAY

1. Literary Evidence of Amount of Pay

Despite the Roman propensity for record keeping, combined with the organization it would take to administer its massive army, there is surprisingly little literary or material evidence of Roman military pay.[1] Yet, a literary review provides a bit of insight into the individual pay rates of Roman soldiers during the period of Late Republic to the Third Century A.D., the time period of this paper. R. Alston, in "Roman Military Pay from Caesar to Diocletian," uses the literature to help recreate a useful history of military pay during this time (114-115). He, along with many scholars, begins with Polybius, who wrote that during the Second Punic War, legionary infantry was paid two oboloi per day (Alston 113-114, Polybius VI. 39 399).[2] This is a good starting point, as Polybius gives a rare specificity for individual rates of pay of soldiers in ancient Rome. Alston assumed that Polybius treated the drachma and Roman denarius as equivalents and that by converting two oboloi to one-third of a drachma, Roman infantrymen were paid about a third of a denarius or three asses per day at that time (113-4)[3]. Polybius also wrote that the cavalry was paid one drachma per day, thus they received more pay as reflective of their high rank status.

Other scholars help to establish Roman soldiers' pay through literary evidence. In his book, *Soldiers and Silver,* Michael Taylor cites Plautus' writings on military pay, which he refers

[1] Per Suetonius in the *Life of the Divine Augustus*, Augustus established the *aerarium militare* (Loeb edition, 228). In *Logistics of the Roman Army at War*, Johnathan Roth writes that this where Rome "kept a record of the exact number of troops in the army, as well as the exact costs which the military entailed" (236). Should documents from this organization still exist, it would have contributed greatly to the efficiency and conclusions of the research for this thesis.

[2] See also Adrian Goldsworthy, *The Complete Roman Army*, 94.

[3] See also Alston's footnote 3 for earlier scholarly support for this conclusion. I am using the denarius for conversions throughout this paper because it was Rome's standard coin as discussed in chapter two.

to as "tres nummi," implying an even three asses a day during and after the Punic Wars in the mid-to-late Republic (112). Taylor equates Polybius's two Greek obols to Plautus's three Roman asses, to state that a Roman legionary received 108 denarii a year, based on the Roman calendar having 360 days (ibid). Tacitus (Ann. 1.17) refers to soldiers' complaints of their low pay of 10 asses per day under Tiberius as part of their demands for a raise to a denarius per day in A.D. 14. Per Alston, Suetonius writes that Domitian paid a *quartum stipendium* of three gold pieces (aurei) worth 25 denarii each (Dom. 7.3, 337, Alston 114). He also cites Cassius Dio who writes that the pay per day before Domitian in AD 84, was 300 sestertii (LXVII, 3.5, 350). Alston notes that Dio (ibid) writes that Domitian raised soldiers' pay an additional seventy-five drachmas per *stipendium* (114).[4] Alston also references Herodian (III.8.4) regarding Septimus Severus' celebration of his victory in the temple of Jupiter where he "distributed large sums of money to the soldiers, he granted them many privileges which they had not previously enjoyed."[5] Regarding Septimus Severus' largess, Alston also cites the *Historia Augusta* which reads, "He gave his soldiers sums of money that no emperor had ever given before" (Sev. 12.2).[6] On the other side of the ledger, Roth notes Polybius' argument that money was deducted from the pay of Roman soldiers to pay for provisions and clothing, though these were given as a "free gift" (en dôrea) to the Italian allies (223).[7] Alston also cites Dio (LXXVIII.36.3),[8] referencing Macrinus' letter to the Senate in A.D. 218 "complaining about the pressure on the imperial finances caused by meeting the demands of the soldiers" (115) based on Caracalla's largess to

[4] Translation from the Loeb Classical Library edition of Cassius Dio's *Roman History* (325). Later, Domitian regretted this. He could not take away the pay raise or the army would revolt, so he reduced the number of soldiers in the army instead.
[5] Translation by Edward C. Echols, from Livius.org, section 3.8.4.
[6] Translation from the Loeb Classical Library edition of the *Historia Augusta* (383).
[7] Polybius also notes that the allies were not paid, but they were given in-kind contributions such as food (VI. 39.12f, 399).
[8] Loeb lists it as LXXIX instead.

the soldiers.[9] This citation of Dio acknowledges the substantial expense Rome incurred when paying all of the individual military salaries. The literary evidence helps to show that all of the expenses in paying Rome's soldiers added up.

Based on this literary review, it appears that the subject of individual military pay was at best a minor topic in ancient writing or if it was more frequent, it did not survive. This is surprising given the importance the army was to Rome's history and perhaps it sheds some light on what the perception of the value of the individual soldiers was to Rome at the time. Although this record of literary evidence is helpful in some respects, it is probably more notable because of its erratic coverage or omissions over the centuries covered in this paper. Gaps in the literary evidence include payment of the auxiliaries and cavalry.[10] Without strong literary support, in the next section, I will examine the documentary evidence to date to attempt to fill those gaps in determining individual soldiers' pay.

2. Documentary Evidence of Amount of Pay

Given the sizable number of people who served in the Roman military, there is similarly sparse documentary evidence on this issue of their individual pay. Speidel and other scholars generally rely on seven documents regarding ancient Rome's rates of individual military pay and one for collective pay. The insight the documents provide is limited by their condition; they are damaged or unclear. According to Alston, all but P. Yadin 722 (from Masada) and the Vindonissa tablet (now Switzerland) originated in Egypt (115). Alston lists the documents generally relied on by scholars and I arrange them by chronological order, as:

[9] Translation from the Loeb Classical Library edition of Cassius Dio's *Roman History* (421).
[10] Because Rome did not put too much importance on its navy, this paper is limited in its scope to the pay of the Roman army.

1. Vindonissa tablet of AD 38;
2. P. Yadin 722 of Ad 72 or 75;
3. RMR 68 + P. Gen. Lat 1;
4. RMR 69 +P. Gen. Lat 4;
5. RMR 70 + ChLa x.410;
6. ChLA x. 446;
7. ChLA xi.495, and
8. P. Panop. Beatty 2

a. Vindonissa tablet of AD 38

The Vindonissa tablet is the most unique and perhaps controversial of this documentary evidence. Speidel notes it is one of the 600 writing tablets from the Vindonissa Fort in what is now Switzerland. Yet, scholars differ on its meaning and consequently its value to the scholarship. According to Alston, the Vindonissa tablet is "a receipt for money received by Clua," a cavalryman of an auxiliary unit (119). However, according to M. A. Speidel in "Roman Army Pay Scales" the Vindonissa tablet was the "missing link" that unlocked the secret of ancient Roman military pay scales. Speidel identifies Clua as a member of Albius Pudens' squadron (354). Based on others' research, Speidel is certain Clua was in the *Raetorum equitata.* This auxiliary unit existed at Vindonissa in the first century and was known as the *cohors VII Raetorum equitata* (ibid). Alston, however, disagrees with Speidel's reliance on this document, because Alston disputes Speidel's translation of it. Speidel translates the last line of the tablet as "I have received 50 denarii, and as next pay 75 denarii," but Alston reads it as, "I have received 50 denarii and 75 denarii of my next pay" (119). Under Alston's translation, the 50 denarii is the

amount of pay due for that period on July 1. The 75 denarii references the future or final payment of the year, which is paid on September 1—the last quarter of the year. Alston reads that to mean that if Clua received quarterly *stipendium* payments of 75 denarii, then he was paid more than 225 denarii per year (119). I agree with Alston's translation because the original text is in the genitive case for *stipendi proximi*. Either way, Roman soldiers received different amounts of pay per *stipendium* which makes calculating pay imprecise. Speidel, however, takes the larger payment of 75 denarii as the base *stipendium*.

b. P. Yadin 722, AD 72 or 75

Alston notes that P. Yadin 722 is similar to RMR 68 and 69 in that they appear to be accountings of Roman soldiers' pay. Romans broke their annual pay into equal installments paid throughout the year. There were either three or four *stipendia* made during the year which totaled for the soldier's annual pay. P. Yadin 722 appears to be a ledger, but it reflects only two, not three payments like the others, plus deductions. According to Speidel, the document includes a date, a heading and a soldier's name, and on the next line, a payment received of 50 denarii (abbreviated as an "x" with a with a straight line through it) with deductions listed (361). The date and heading are not well preserved. The soldier's name is C. Messius C. f. of the Fabia tribe from Beirut, or as Speidel says: "this is for C. Messius from Beirut, a Roma citizen based on his Fabia tribe" (ibid). Although no rank is indicated, most of the scholars think he was in the legion. Given its structure, it is easy to read P. Yadin 722 as a ledger like some of the other artifacts. Thus, it reflects that Messius was paid a 50 denarii *stipendium*. The artifact also lists, as Alston refers to them, the "standard camp expenses" which total 50 denarii (118). The legible deductions total 34 denarii, but the first entry is missing. Many scholars calculate that the missing amount is at least 16 denarii, which would cause his expenses to equal his pay, so that

the soldier did not receive any currency for his pay (118). The second section starts with payment of at least 60 denarii ("LX[]"), but the remainder is missing. Per Alston, although partially preserved, this section shows "two of the entries record transactions made to 'named individuals'" because of "private transactions" (ibid). I assume these are loans or advances. Again, Alston notes the two different amounts of pay can be problematic in calculating pay scales. Speidel explains the difference by suggesting the lower first amount reflects a debt owed elsewhere, but Alston points out that the Roman state would repay its debts as a priority over other debtors, so this is unlikely to explain the difference. I agree with Alston but suggest another possible explanation of the difference that supports Speidel's explanation and answers Alston's concerns. Perhaps, the difference is a "loan" from the state. Much like a modern payday loan, this explanation would then allow Rome to pay itself first as a creditor. Alston suggests, however, that this is a request for extra money, possibly to cover the soldier's own debts or even because he was going away during the next pay period and would want to be paid early. Yet, Alston still views RMR 68, discussed below, and this document similarly, because they both show an accounting of 50 denarii per *stipendium* and 50 denarii deducted to pay for expenses (ibid). Despite this controversy, one positive about P. Yadin 722 is that it is easy to read because of its condition, making it more reliable once one agrees on the translation.

c. RMR 68 = ChLA x. 410, 83 AD

First published as P. Gen. Lat 1, Alston refers to this collection of pay documents on papyrus, as four documents "pasted together to create a single large sheet of papyrus on the verso of which was written a duty roster of a century" (115-6).[11] Fink published this duty roster on the verso as RMR 9 and RMR 58. Per Alston, RMR 9 lists the duties of a unit of 31 men for 10 days,

[11]Alston refers to them by Fink's separate publication numbers.

beginning in the month of Domitianus, "giving a *terminus ante quem* for the document on the death of the emperor in AD 96" (116). RMR 9, 10, 38 and 68, list men with Roman names, so Alston says this plus the probable name of the legion suggests that the men listed in the roster were all legionaries at Nikopolis, probably the III Cyrenaica (ibid) and along with RMR 58 are examples of duty rosters. (ibid). RMR 10 is a partial duty roster listing three men's duties (ibid). According to Alston, Fink dates RMR 10 to A.D. 81 based on a consular date in line 1 column 2, but it is unclear if this refers to payment dates (ibid). Also, according to Alston, Kaimio says other military texts place the date of enlistment at the head of the entry (ibid), so this might be the date reference. Alston notes that if the text in RMR 10 was analogous to RMR 70 (discussed below):

> all those beneath the same consular date will have enlisted in the same year, explaining why there is [a] consular date above the second entry and why Proculus' and Germanus' entries appear tighter. The date, in fact, appears in the 2nd line of the entry, which reads from col. iii, 'accepit stip i an iii do dr ccxlvii s' (ibid).

According to Alston, Fink translates this to "received the first pay of the third year of the emperor 247 and a half drachmas" by expanding "*do"* to *"do(mini)*" (ibid). Fink also reconciles the date and the consular date—assuming that the emperor is Titus (ibid). But Alston says a more plausible restoration was "Domitiani" dating the payment to A.D. 83 (ibid). I agree with Alston because they did not officially refer to the emperor as *dominus et deus* until after the Crisis of the Third Century. Yet, I concur that RMR 58 is the duty roster of the third legion in Nikopolis.

Alston says that RMR 68 is probably the most important of these documents (ibid). RMR 68 seems to suggest a year's pay for two soldiers, Q. Iulius Proculus from Damascus and C. Valerius Germanus from Tyre. Despite its poor condition, Alston (relying on Fink) suggests that the first section probably reflects a payment of 247 and a half Alexandrian drachmas. Alston uses a conversion rate of four drachmas to convert this to 61 denarii and ¾ sestertii (ibid). Using a

base pay of 247 and a half Alexandrian drachmas and assuming three payments per year, would suggest an auxiliary annual payment of 742 and a half Alexandrian drachmas or 185 5/8 denarii annually (ibid). Alston refers to that amount as "82.5% of annual legionary pay at this date" (ibid). Speidel disagrees and says that the payment was "247.5 drachmas which is 5/6 of 300 hundred drachmas which was the rate of legionary pay" (351-2). Alston notes that the same amount of payment is made three times but written by different people based on the differences in handwriting ("entered in a different hand") (116). The units are not listed. As noted above, Alston notes that from each of these three *stipendia* during the year, the Roman government subtracted "standard" deductions/expenses including shoes, hay, etc. (ibid). Alston translates RMR 68, "in the first two thirds of the year, both men accumulated a small surplus which was retained for them," after repaying the government for their supplies. But in the final third payment of the year, "they both spent their full 247 and a half drachmas" (ibid). Even though Alston refers to these as the "standard" deductions, the regular 1% deduction (discussed more fully below) is not reflected. Per Alston, because the amount paid equals the deductions, it may not refer to the full amount of pay or even 99% of pay (ibid). Although Speidel sees it as a ledger, Alston says RMR 68 might just reflect a deposit into a soldier's expense account after pay for his camp expenses, which would explain the difference in the amounts deposited (117). Although ambiguous, I agree with Speidel. If it was a "deposit slip" in modern commercial parlance, into the soldiers' army account it would read "*deposuit stipendium*" not "*accepit stipendium*."

d. RMR 69 P. Gen Lat 4, Late First Century

Because RMR 69 is not well preserved, it is problematic to rely on it. Per Alston, Fink says, "the task of reading the scanty text and reconstructing the account has been formidable and

rendered worse by the clerks' many errors and corrections" (117). The left side is missing, so presumably whatever entries or explanations that might have been there are gone. Even then, whatever figures that would tie to those entries are only partially preserved. Alston speculates that the first section probably reflects a payment of 297 Alexandrian drachmas, with deductions of 216 drachmas, 2 ½ asses. That balance of 96 drachmas is, according to Alston's translation, changed or "corrected" by a clerk to 80 drachmas, 3 ½ asses (using a 6 as drachma) (ibid). The second section of RMR 69 also suggests another payment of 297 drachmas, but based on the poor condition of the artifact, that is unclear. Beyond that, the third section is impossible to read according to Alston (ibid). But Speidel reads this fourth section of ']ccxc[v]oo' or 297 Alexandrian drachmas to reflect a fourth payment, but he admits it is very unclear (ibid). Beyond the missing pieces, Alston says it is illegible due to the poor condition of the text. Even though the soldier's name is illegible, Fink reads it as [Qu]adratu[s]. The document does not indicate his unit or status. Thus, Alston argues that RMR 69 is not useable for evidence of military pay scales given its poor condition and I agree.

e. <u>RMR 70 = ChLA x. 410, 192 AD</u>

Like the others, RMR 70 also appears to be an accounting of soldiers' pay. Alston describes it as a listing of "amounts on deposit in individual soldier's accounts, a payment into those accounts, deductions from the accounts (see below) and finally gives balances" (118). Per Alston, the list of non-Roman names suggests auxiliary, but it is unknown if infantry or cavalry (ibid). He states that in most of the accounts, soldiers had 175 denarii on deposit of which 75 denarii was the *viaticum* or travel money (ibid). Per Alston, "most received payment of 84 denarii 15 ¾ oboloi, from which a tax of 4 denarii 22 ½ oboloi was deducted, leaving 79 denarii

21 ¼ oboloi that the soldiers withdrew" (ibid)[12]. Continuing his theory that soldiers had deposit accounts he notes that "some soldiers did not deposit any money in their account and the tax was deducted as a debit" (ibid). Again, Alston argues here that RMR 70 was not the soldier's pay account, and that there was a different document that was the pay ledger for the unit (ibid). Like RMR 68 and 69 above, Alston suggests that RMR 70 was more like a modern bank deposit slip used as a record of an accounting for the soldier's expenses (ibid) and cannot be used as evidence of pay but I continue to disagree and see it more as a pay stub. If read on its face as simply a pay stub with pay and deductions, the evidence suggests that the government "giveth and taketh away," as discussed more fully in the section on deductions, below. Finally, the date is under debate. Per Alston, Fink dates RMR 70 to 192 A.D. (ibid), but cites Marichal, who rejects Fink's arguments. However, a general dating that is useful is that both date it to prior to Septimius Severus' pay raise (ibid).

f. ChLA x. 446 = P.Berol. inv. 14100, probably Third Century

ChLA x. 446 is probably a ledger hand-dated to the Third Century, but there is no detail of the rank of the soldiers (118). Per Alston, it reflects a payment of 257 denarii and 22 and 3/4 oboloi (ibid). Using this as the amount of pay received each pay period, multiplied by three would yield an annual amount of 773 denarii and 12 1/4 oboloi or 99% of 3,125 Alexandrian drachmas (781 1/4 denarii) (118-9).[13] Alston notes the possible concerns of odd amounts of payment such as the 12 1/4 oboloi here. He explains this away by noting that RMR 70 21 ½

[12] Speidel's footnote 17 notes "a limitation on deposits imposed by Domitian to ensure that usurpers could not obtain cash merely by taking over the legionary bank." He suggests that this limitation may account for the withdrawal of the surplus. Suetonius noted that Domitian limited soldier's savings to a maximum of 1,000 sestertii or 250 denarii. (350). He did this in an effort to thwart generals' embezzling soldier's accounts to subsidize their attempts at revolution such as Lucius Antonius did (Dom. 7.3).

[13] The 99% figure shows that the standard 1% deduction applied on all soldiers' accounts.

oboloi referenced above) and RMR 22 both show odd amounts (e.g., three-fourths oboloi) and ChLA xi.495 poses a similar problem. Alston suggests this document should be read with ChLA xi 495 below.

g. ChLA xi 495 P.Hamb. inv. 310, Likely Third Century

As noted above, Alston suggested that ChLA xi 495 and ChLA x. 446 be looked at together. Like ChLA xi 446, the date of ChLa xi 495 is unknown, but "dated by hand to the Third Century" (118). It is also for an unknown rank of soldier. It reflects a payment of 257 denarii and 22 and 1/4 oboloi, according to Alston (ibid). If this amount was paid three times a year, per Alston, it would be an annual pay of 773 denarii and 10 and 3/4 oboloi. For Alston, both fragments are too small to be used for a conclusion on the "nature and function" of these as accounts (119). Despite their difference in format from RMR 68 and 69 and P. Yadin 722, Alston suggests that these accounts may all have been used for the same purpose as a modern deposit slip (ibid). I agree with Speidel that these could be Roman pay ledgers but have reservations about their usefulness.

h. P. Panop. Beatty 2, 300 AD

P. Panop. Beatty 2 differs from most of the other documentary evidence discussed so far because it is a collection of letters that reflect a "lump sum" payment transferred to the units for payment of soldiers at the unit level (115). Alston details it as three requests "to the city of Panopolis to pay the salaries of the troops stationed there in Upper Egypt" (119). It requests that "73,500 denarii be paid to an *ala*, 65,500 denarii to a cohort and 343,300 denarii to a number of legionaries" (119). I agree with Alston's assumptions that this payment was gross pay and that there were no other additions to the amounts. He concludes that it is an unhelpful document for reconstructing rates of military pay, because it contains too many unknowns—including the

number of soldiers in each class, etc. Perhaps a better interpretation of this document is to think of it as an "order" where the Roman government disburses a lump sum payment and ordered the units to use it to meet its payroll obligations.

In conclusion, when looking at this evidence collectively, I support Speidel that many of these are pay ledgers and not deposit slips. First, the language is very similar on P. Yadin 722 and RMR 68, 69 and 70 where they all begin with "*accepit stip – an – do dr* -". Second, they list deductions which a deposit slip would not because they all say "ex eis faenaria dr -, in victum dr -, caligas fascias dr -…". After reviewing these artifacts and acknowledging their preservation problems, I support Alston's concerns about relying on these documents to calculate individual Roman soldier's pay, yet, I support Spiedel's calculations as set forth below.

i. P. Harris 183, First Century

I supplement Speidel's list of known documentary evidence of Roman soldier's pay to include an eighth papyrus, P. Harris 183, which was only recently translated as to miliary pay in about 2017.[14] According to Ornella Salati in "New Evidence on Latin Military Pay Records," P. Harris is similar to the other papyri discussed above and it comes from about the same time. Salati also says it was written in a similar style. This document is also heavily damaged and missing much detail. What remains lists two soldiers who were each paid 247 and a half drachmas (267). According to Salati this is a similar rate of pay to P. Gen. Lat 1 (268). Because the artifact is so damaged, it is hard to tell what the amounts of the stoppages were. Salati argues that even without evidence of them on the document, that they were deduction because they follow the words, "*ex eis*" which means "from these" and that they were positioned underneath

[14] Interestingly, P. Harris was originally translated in the 1930s but not the military pay stub that is included in this thesis, but the Greek poem that was written on its reverse. Only in the next century did scholars note the value of the other side of the document, which adds another military pay document to the very small body of evidence.

this phrase in a way that was similar to the other documents above (268). The first soldier's name is mostly illegible, but she thinks it says "Nicenus" (267). For the first soldier the only legible numbers are "5 obols" and "12." The second soldier's name is legible and is Lucius Clodius (*L Clodi*) (268). There is a clearer list of the deductions for him. The first is for food in the amount of 5 obols, the second is for animal feed and is probably 12 drachmas, and third is sandals and socks of a missing amount and fourth, although the contribution to the camp Saturnalia party is listed, the amount is missing (269). This is followed by a possible fifth deduction, possibly for clothing, but it is uncertain because it is hard to read. Finally, there is a sixth deduction for a tunic, but the amount is missing. After this are the letters PO which Salati reads to be part of the phrase that "he deposited the rest" based on the Latin phrase *reliquas deposuit* (270). She notes it is in a similar place to the other alleged paystubs discussed earlier (270). Using P. Gen. Lat 1, she reconstructs the last line of P. Harris to read, "and he had from his previous pay" but because of the damage she is not sure.

3. Scholarly Attempts to Create Roman Army Pay Scales

As shown above, little evidence survives on the issue of how individual solders were paid in the Roman military during the late Republic through the Third Century AD especially when compared to how much of it once existed from paying Rome's vast troops. Even when textual artifacts are found, they are often in bad condition and unreadable in parts. Despite this, scholars have tried to recreate Roman military pay scales. In this section I will focus on scholarly attempts to do so.

a. Legionary Basic Pay and Raises to the Second Century

Most scholars agree with on when pay raises occurred in ancient Rome and many agree on the individual amounts of pay Roman soldiers received, especially from Ceasar up to

Septimus Severus' raise. The conventional wisdom is that soldiers received their pay in three installments or *stipendia* per year on the first of January, May and September until the time of Domitian (350). According to Duncan-Jones in *Money and Government in the Roman Empire*, "the pay of a legionary during the First Punic War and the first half of the Second Punic War was certainly not as high as it was during the second" (1994, 363). According to Alston, per the literary record of Polybius, during the Punic Wars, the Roman state paid two oboloi per day to the legionary infantry or about a third of a denarius, about three asses per day during the Republic (CI. 39 12f) (114).[15] Both Speidel and Alston agree that the next raise came in the time of Caesar. Alston cites Suetonius' *Life of the Divine Julius Caesar* (Div. Iul, 26.3) that Caesar doubled that amount of pay (*legionibus stipendium in perpetuum duplicavit*) (114). Thus, if the basic rate of legionary infantry pay before Caesar was 225 denarii per year (three payment of 75 denarii), Caesar raised it to 300 (three payments of 100 denarii) (114 and 350).[16] Speidel also cites Tac., Ann. 1,17,4 to break this into a daily rate of 10 asses per day or 912.5 sestertii a year (350). When multiplied by three pay periods, the soldier would earn 900 sestertii per year under Caesar/Augustus (350).

Many scholars agree that the next times Rome increased its pay to the troops was under Domitian in A.D. 84. There, soldiers got a one-third pay raise to 400 sestertii per pay period or an annual rate of 1,200 sestertii per year (114).[17] Alston, too, notes that, before the raise, the

[15] Per Alston, Polybius valued the drachma and the denarius equally, and two oboloi were one-third of a drachma.
[16] Speidel reckons it in sestertii with a conversion ratio of four sestertii to the Roman denarius (350).
[17] Alston writes that during Domitian's reign, soldiers were paid four times a year (quartum stipendium), not three (350). So, foot soldiers were paid an annual rate of 1,200 (or 300 per quarterly pay) sestertii. Alston also writes that when the *quartum stipendium* was abolished, they continued to receive the full 1,200, but in the traditional three pay periods of 400 sestertii (350). I would argue that this could be viewed as a pay cut, because although soldiers received the same annual pay, they had to wait longer to get it when made in three installments. I would think that the soldiers would view this negatively, too, because previous changes to pay had always resulted in a pay increase. This was the first time that pay was changed with no concurrent pay increase. Another question this raises is, why was the quarterly (four-pay) system abolished and returned to a three-pay system? Was it to allow the state to hold on to these large amounts of full payroll for a little longer?

soldier's pay was three payments of 3 aurei. After the raise, pay was three payments of 4 aurei.[18] Alston says this suggests a yearly raise of 225 denarii a day or 3,600 asses (ibid)[19]. For literary support, Alston cites Dio and Suetonius, who confirm the amount (ibid). Tacitus blames that raise on mutinous legionaries who complained of their low pay of 10 asses per day and demanded a denarius per day in A.D. 14 (Ann. 1.17). Speidel says this shows that Tacitus, the "soldier's soldier" always advocated for his troops and used the low daily rate to dramatize soldiers' dire financial needs. Alston also ties the level of increase "in part" to the value of the aureus. Alston also cites J. Jahn's article, translated as "The Pay of Roman Soldiers," where he cites Suetonius' *Life of Domitian* to argue that "Domitian increased the amount to 300 (denarii)," which was initially paid in four installments but later reduced to three payments (218).[20] Alston asserts that the "least contentious figures to emerge from all the evidence reflects Domitian's pay raise in A.D. 83" (114).

Many scholars agree that the next pay raise was by Septimius Severus in AD 197, which, as Jahn noted, Herodian supports when he quotes an "increase (which) was greater than all previous ones" (350). Some scholars, like Jahn and Speidel, argue that Septimius Severus doubled the amount of soldier's pay to 600 sestertii [(Speidel 350, table 1)[21] (111.84)]. Others, like Alston, do not assign that percentage even though they acknowledge a substantial raise. Assuming for sake of argument Speidel's 100% raise under Septimius Severus that raise would be an additional 75 denarii at a conversion ratio of 25 denarii per aureus. Speidel summarizes

[18] Alston notes how tidy these even numbers are (114).
[19] It is interesting how Roman authors used different coins to reckon different kinds of expenditures. Perhaps here, Tacitus' use of denarii illustrates that it has become the standard unit of reckoning.
[20] The article in in German, and the translation is provided by Google Translate and is from Suetonius' *Lives of the Ceasars*, book 8, part 3, which refers to Domitian (337).
[21] Again, Jahn's article is in German, and this is a translation from Google Translate. Speidel also cites the *Historia Augusta* (Sev. 12.2).

this in table 1, recreated here (Bolding is added by Speidel to show which of his numbers are supported by documentary or literary evidence):

Date	Stipendium	Annual Pay	% Increase
Caesar/Augustus	**300**	900	**100**
Domitian (A.D. 84)	**400**	1,200	**33.5**
Septimius Severus (AD 197)	800	2,400	100

Thus, Jahn, Speidel and Alston join many other scholars in their agreement on this history of pay increases for individual legionary foot soldier's basic pay, at least until Septimius Severus. Based especially on the literary evidence cited by Jahn, I am confident in these pay scales up to Septimius Severus.

b. Third Century Legionary Pay

Because of the ambiguity in the literary evidence and the resulting divergence between Speidel and Alston on the percentage of Septimius Severus' pay raise, the latter challenges Speidel regarding the underlying calculations for subsequent pay under Caracalla and Maximinus Thrax. Although both Alston and Speidel note that Herodian said that Caracalla's pay raise only referenced the praetorian guards (114, 212), they both read Dio to apply that the increase to all of the troops (LXXVII. 36.3-4).[22] As a result, both agree the last increase in pay before Diocletian was by Maximinus Thrax in AD 235, when he was trying to become emperor

[22] Goldsworthy questions whether Dio's reference to the guard receiving double salary of the legionaries is just a rough approximation (94).

who doubled the troops' pay to earn their favor.[23] Yet, the two scholars disagree on the numbers because, according to Alston, such calculations are built on the size of Severus' increase in pay, which is unknown (114). Alston assumes that Severus adopted the prior system of three pays per year and using the aureus he suggests only four possible scenarios could occur. Alston suggests that Severus possibly increased the pay by 1 to 4 aurei per pay or 3 to 12 aurei annually. This would lead to a 25%, 50%, 75% or 100% pay increase raising annual pay to 375, 450, 525 or 600 denarii, respectively. According to Alston, using these numbers as the base for Caracalla's subsequent increase of 50% would raise annual basic pay to 562.5, 675, 787.5 or 900 denarii. Alston then rejects those that do not divide evenly into the three pay periods, 562.5 and 787.5, and suggests that using them would be a "break" in the use of the "payment in aurei" rule which he advocated for (cf. note xvii).[24] Although he concludes that the amount of the raise is unknown, if he had to pick, then he would use the even numbers of 50% and 100% for the AD 197 pay raise (115).

In contrast, when Speidel created his individual pay charts for the Third Century, he claims that by the time of Caracalla, documentary evidence showed that there was a 50% increase and calculated individual legionary pay at 1,200 sestertii per *stipendium* or 3,600 sestertii per year (or 900 denarii at a 4 to 1 ratio) (350). According to Speidel, Caracalla gave this large pay increase to secure soldiers' support after he killed his brother, Geta, per Herodian (ibid). Speidel also notes that according to Herodian, he promised to give each soldier 2,500 Attic drachmae and he increased their normal pay by a half.[25] Building on that, Speidel cites

[23] There is a suggestion that in his efforts to get in the troops' good graces, Thrax also gave them their food for free instead of charging them for it (114).
[24] Here Alston differs from Speidel who although concerned about "odd amounts" seems willing to accept them for his calculations, as discussed above.
[25] This is according to the Loeb Classical Library, Book 4, chapter 4, section 7.

evidence of a 100% pay increase during the time of Maximinus Thrax in 235 AD to estimate an annual pay at 7,200 sestertii per year or 2,400 per *stipendium* (ibid). As raised earlier, he references Macrinus' letter to the Senate in 218 AD about the damaging impact of the cost of the military on the Empire's budget, where he claims that Caracalla's increase amounted to 70 million denarii a year (ibid). Alston, too, cites that letter (115). Using his 50% and 100% pay increases, he calculates that this 70 million denarii would cover the basic salary of 311,000 or 233,000 legion foot soldiers (ibid). Yet, Alston challenges Speidel's conclusion by speculating that if Severus increased pay by 50% to 450 denarii, then Caracalla's increase would raise basic legionary pay by only 225 denarii.[26] Here Jahn goes to the material evidence of RMR 70 which he translates as a *stipendium* for a *miles cohortis* in 192 AD of 84 denarii 153/4 obols (367). Thus, according to Jahn the yearly pay would be 125 sestertii in 192 AD or about 256 denarii and one sestertius. Speidel notes that this is more than his initial calculations, but Jahn suggests, without evidence, the 25 extra sestertii was part of a donative. Although not precise, Jahn's use of the literary and material evidence for support persuades me to agree with him and Speidel that individual Third Century Roman military salaries can be calculated with some certainty but less than the earlier calculations.

c. Auxiliary Pay Scales to the Second Century

Despite the scholarly disagreements, calculating legionary salary seems easy when compared to looking for evidence to try to calculate auxiliary pay. Speidel makes such an attempt

[26] Alston notes that the record suggests 165,000 troops (33 legions of 5,000 soldiers), of which he assumes a 10% reduction in staffing, or 148,000 soldiers. He combines that calculation with the fact that junior officers were paid more, often in multiples of foot soldier pay, to conclude that the lowest estimate in size is 160,000. He then says the auxiliary would be 151,000 or 73,000 units (115). Per Alston, "assuming the doubling of pay under Severus, the 70 million would only fund Caracalla's increase if the auxiliary received less than 50% of legionary rates of pay which is extremely improbable" (115). Alston estimates that the "most likely rates from Severus to Diocletian (assuming no increase after Maximinus Thrax's reign) are 450 denarii from 197 to 212, 675 denarii from 212 to 234 and 1,350 denarii" after that (350).

using the traditional eight documents "thought to attest rates of pay" (115), and both he and Alston find some of the papyri lacking. Speidel and Alston note that scholars disagree on the influence of the Panopolis papyrus of AD 300, (P. Panop 2,36ff, P. Panop 2,292 f and P. Panop 2,57) which request payments of "73500 to an ala or calvary unit, 65500 to a cohort, and 343 to be paid to a number of legionaries" (Alston, 1994, 119). Because the requests do not specify the number of recipients, I argue that they are not helpful for determining individual pay. Yet, they do reflect a substantial amount of money needed to pay only three units of troops at the time in one place which is helpful for my subsequent analysis on total cost of pay to the military, below.

Speidel tries to calculate auxiliary pay by turning to his "missing link"—the Vindonissa tablet, or as he says, "the last page of a pay receipt, with the lower half missing" (353). Alston acknowledges that it is unique among the traditional material evidence on this subject (115). In further detail, he identifies it a as pay receipt for Clua, "a member of a squadron (*turma*)—a subdivision known only in the *auxilia*—led by a certain Albius Pudens" (355), which shows a payment of 50 denarii and a later payment of 75 denarii. Speidel uses these numbers as the salary of an *eques cohortis* before Domitian's pay raise in A.D. 84 as the lynchpin to build his auxiliary pay scales (357). With his confidence in the purpose and content of the Vindonissa tablet, Speidel asserts that there is "for the first time safe and unambiguous evidence" (ibid) for the pay of an auxiliary soldier with known rank before Domitian's pay raise of 75 denarii. According to Speidel, this equals 300 sestertii per *stipendium* or 900 sestertii annually (225 denarii) (ibid). He then equates the pay of the horseman in the cohorts with the pay of a legionary soldier and claims they earned 300 sestertii (378). M.A. Speidel cites M.P. Speidel in "The Pay of the Auxilia" when he states that RMR 69 shows pay of 250 sestertii and concludes that it must apply to the auxiliary, because RMR 68 shows pay of 300 which would apply to the legionary soldiers

(352)[27]. Using this, Speidel asserts that RMR 70 also shows the pay of the auxiliaries (ibid). But he then admits that based on his 5:6 theory discussed below, the numbers do not work.

Despite this inconsistency, Speidel continues to use his 5:6 rule in his analysis of RMR 68 to say that if Domitian raised the pay of the *auxilia pari passu* with legion pay by one third, then the ratio between *miles cohortis'* basic salary and *miles legionis* was 5:6. Speidel notes that the difference in pay between a *miles cohortis* and an *eques cohortis* before A.D. 84 was 150 sestertii per year or 50 sestertii per *stipendium* (357). Speidel calculates that the difference in pay before A.D. 84 may have been 150 sestertii annually "amounting to an annual pay of 1,050 sestertii or 350 per *stipendium*" (ibid). Speidel looks to Vegetius, who he says shows the *equites legionis* received more basic pay than the *miles legionis* (which equals an *eques cohortis*) based on Vegetus' quote, "*cum naturaliter equites a peditbus soleant discrepare*" (Veg. Ep. Rei mil. Section 21 of Book 2, 357).[28] Speidel contends that his pay scale makes sense, because it would reflect that a foot soldier had to wait several years for a promotion to the *equestria stipendia* (ibid). Speidel further supports this by citing Hadrian, who wrote that the "*equites alae* also received a higher pay than *equites cohortis* (which is the same as a *miles legionis*)" (358). Thus, Speidel concludes that there was no difference in pay between an *eques alae* and an *eques legionis* (ibid). Per Speidel, this would make sense because soldiers transferred between the auxiliary and the legion and would not likely do so if they lost pay (ibid). Speidel gives another example of the promotion and transfer of T. Claudius Maximus, who captured Decebalus and was promoted by Domitian from *vexillarius equitum legionis*. Speidel assumed that both horsemen in the *legions* and *alae* were paid the same basic *stipendium*, so this promotion would

[27] Because M.A. Speidel is cited so regularly in this thesis and I only cite to M.P. Speidel in "The Pay of the Auxilia" twice, for efficiency and clarity herein, I refer to M.A. Speidel as "Speidel" throughout and in these two references to M.P Speidel here, I identify him by the initials of his name.
[28] Translated from *The Latin Library*.

include a 25% pay raise.[29] Speidel uses further examples of M. Licinius Fidelis, who was promoted from *eques legionis* to *duplicarius alae*, and M. Annius Martialis, who was promoted from *miles legionis* to *duplicarius alae* (ibid) in the 1st Century AD and received an even greater increase (358). Thus, Speidel says that it was possible that e*quites legionis* and *alae* received "the same basic pay of 1,050 sestertii annually before A.D. 84" (ibid).[30] Using this, Speidel creates his auxiliary pay scales for the First Century, by branch and rank, before and after the AD 84 pay raises as set forth here (again he bolds the numbers that he claims evidentiary support for):

		Before AD 84	**After**
Miles Cohortis	Basic	**750**	1000
	Sesquiplicarius	1125	1500
	Duplicarius	1500	2000
Eques Cohortis	Basic	**900**	1200
	Sesquiplicarius	1350	1800
	Duplicarius	1800	2400
Miles Legionis	Basic	**900**	**1200**
	Sesquiplicarius	1350	1800
	Duplicicarius	1800	2400
Eques Legionis	Basic	1050	1400
	Sesquiplicarius	1575	2100
	Or alae Duplicicarius	2100	2800

[29] In contrast, Alston states that there is insufficient evidence from the known documents to know what the cavalry or auxiliaries were paid beyond the first century BC and that ends it for him (113). Alston, however, does acknowledge the exception of the earlier reference to Polybius which shows a difference in pay.
[30] Both M. P. Speidel and Michael Alexander Speidel look to texts in the Corpus Inscriptionum Latinarum for further support in calculating auxiliary pay scales.

Some new translations of existing documentary evidence suggest additional support for Speidel's pay scales, especially the payment to a *miles cohortis* of 750 sestertii or 187 and a half denari annually. The first is a new translation of P. Yadin. In his article, Spiedel translates P. Yadin as 60 denarii for the amount of pay for the second *stipendium* or 180 denarii, per year. When comparing this to Spiedel's tables of pay, using this translation amounts to a difference of seven and a half denarii per year. In keeping with Rome's tradition of standardization, if military pay is standardized even this difference seemed unlikely. However, 26 years after Speidel's publication of his work, Christopher B. Zeichmann in §22 of the Database of Military Inscriptions and Papyri of Early Roman Palestine, translates the second payment to 62 denarii, putting the 2 in brackets ([2]) (Zeichmann, 2018). Using Zeichmann's figure, the annual gross is 186 denarii, and the amount of the difference is reduced to a mere half of a denari per stipendium or one and half denari per year. It is still not equal to Spiedel's pay scale, but it is much closer. Yet, I admit to some concerns of bias on this latter translation which reads, "LX[II]" in that Zeichmann could have been influenced by two decades of acceptance of Speidel's numbers.[31] The second new translation helps strengthen Speidel's lower pay scales even more and involves P. Harris. Salati writes that the pay reflected in P. Harris was similar to P. Gen Lat 1 or RMR 68, which is the pay of an auxiliary soldier of 247 and a half Alexandrian drachmas, the exact amount on P. Harris. Although P. Harris is too illegible to determine the rank of the soldier paid, matching the similar salaries helps to provide further evidentiary support of Speidel's pay scales. As a classical archaeologist, I am excited to see more material evidence for military pay

[31] Also, if the original amount of 50 denarii is used as the base pay, there is a sizable difference. Speidel suggests that reflects an earlier "loan" of pay from the military to the soldier or *debet ex priore ratione* (362). This would suggest evidence of military "payday loans" (where earlier loans are repaid from current pay) in ancient Rome.

calculations and I am more comfortable accepting Speidel's calculations of the First and Second Century pay rates.

d. Third Century Auxiliary Pay

Based on his earlier numbers, Speidel creates the pay of the individual for the auxiliary in the Third Century. Speidel looks to RMR 70, an auxiliary pay record from A.D. 84, as well as ChLA 446 and ChLA 495, for further support of his projections (367). He uses Jahn's readings of RMR 70 as *stipendia* of 84 denarii 15 ¾ obols, for ChLA 446 as 257 denarii 22 ¾ obols, and for ChLA 495 as 257 denarii 22 ¼ obols. Yet, Speidel continues to challenge his own research for similar concerns of my own. Regarding the odd amounts such as three-fourths or one-fourth of an obol, Speidel said that this is not a problem because Roman military accounts have had to deal with this at least since the time when the yearly number of *stipendia* changed from four times per year to three times a year in the *stipendium Domitiani* (366). Speidel also addresses the discrepancy between the salary of a *duplicarius* of the auxiliary under Maximinus Thrax, which based on Jahn's translation of RMR 70, is 25 sestertii more than the 1,000 sestertii in Speidel's table. As the author says, "there seems to be no obvious explanation" for this difference, too (ibid). He cites Jahn's general suggestion that "this may have been a bonus of some kind" (ibid). or Speidel says it is a "further state contribution towards the soldiers' pay for a mathematical explanation confined to the *stipendia* [that] seems unavailable" (ibid). Similar issues arise with the other two papyri, ChLa 446 and ChLa 495, that show yearly salaries of 3,125 sestertii, but the author says that is 3,000 plus 125 sestertii or a so-called "bonus" as raised above. Using these "rounded" sums, Speidel argues that they resemble RMR 70. Additionally, scholars dated the papyri to the Second/Third century (ibid), and Jahn dates them to the early Third Century. When Speidel agrees with Jahn's date of the early Third Century, after Caracalla's pay rise of 212 AD,

which increased the soldier's normal pay by a half per Speidel's table 1, it helps Speidel's calculations work if ChLa446 was created after Septimius Severus' pay raise. Using the possible pay raise amounts of 33%, 50% or 100%, the sum of 3,000 sestertii plus 125 is the annual income of a *miles cohortis* drawing pay and half after getting first a 100% pay raise then an additional 50% raise, which then matches Speidel's projections on table 3. In a further effort to reconcile the 125 sestertii differential, Speidel then suggests that ChLA 446 (and ChLA495) could be pay records for a higher officer like a *sesquiplicarius*, but even Speidel admits that is unlikely (ibid). Given Speidel's own reduced confidence in the auxiliary pay, I too have less confidence in the numbers.

Speidel makes a substantial effort trying to estimate auxiliary pay for the Third Century, which he says is confirmed in the Panopolis papyri, but it is less certain. The problem, again, with the Panopolis papyri is that it directs the payment of a lump sum of 262,000 sestertii to an unknown number of soldiers. Speidel admits that his calculations cause him to "cross check" his "conjecture" to both confirm his proposed pay tables and the 5:6 ratio (369). Again, he relies on some of the documentary evidence, but even he acknowledges how speculative some of it is and how much is unknown. Adding in Maximum Thrax's 100% pay raise means that a *miles cohortis*' annual pay of 6,000 sestertii or a *stipendium* of 2,000 sestertii divides exactly into 131 payments or individual soldiers under P. Panop 2,292f (351), which if paid in denarii would also be an even number of 500. Yet, Speidel acknowledges the number of troops is unknown, so it could be twice that or half. For example, if there were only 100 soldiers stationed there, they would receive pay of 2,620 sestertii—also an even number which is also a whole number that converts to 655 denarii. Speidel also cites Jahn's attempt to establish a cavalryman's pay using prime numbers, which too results in 131 soldiers being paid 2,000 sestertii. That corroboration is suspect, because as the

author notes, it failed when Jahn used it to try to establish other types of pay on the scales. To get to the suggested result, Speidel notes that it would "entail a considerable pay-cut" which I argue would be unlikely and could lead to a mutiny or a full-scale rebellion by the troops. Or perhaps some of the author's proposed raises during the Second and Third Centuries A.D. did not happen, which he says was "rather unlikely," too (368).

Speidel uses these numbers to calculate individual auxiliary pay for the Third Century, but I think such calculations are less certain than earlier numbers for individual pay. Similarly, when Speidel cross checks his numbers against the 343,300 denarii for an unknown number of soldiers in P. Panop 2.57, it does not fit neatly using the proposed numbers. Here, Jahn blames it on a "a scribal mistake" (369). Jahn assumes "the scribe of the papyrus had actually meant to write 343,200 denarii instead of 343,300 as was on the papyri" (ibid). Speidel advocates for changing the number to 343,200 and then his projections will work. Adding to the uncertainties, Speidel then acknowledges that not only are the numbers of soldiers paid with this money unknown, but so is their rank. Again, Speidel argues that his numbers hold if the calculation includes multiples of legionary horseman's pay. Yet even he acknowledges this results in either a very high number of *stipendia* being paid or a large number of soldiers at the site. This further supports my challenge, above, where I randomly reduced Speidel and Jahn's proposed number of soldiers of 131 to 100 and came out with an even number. I further support this because the Roman military was heavily standardized. It would be more likely that there would be 100 troops at the site, or a full century. Despite these possible weaknesses, Speidel estimates the Third Century axillary pay scales in sestertii per year (again, with those supported by evidence in bold) as set forth below:

Unit	**Rank**	**Severus (AD 197)**	**Caracalla (AD 212)**	**Maximinus Thrax Ad 235**
Miles Cohortis	Basic	2000	**3000**	**6000**
	Sesquiplicarius	3000	4500	9000
	Duplicarius	4000	6000	12000
Eques Cohortis	Basic	2400	3600	7200
	Sesquiplicarius	3600	5400	10800
	Duplicarius	4800	7200	144000
Miles Legionis	Basic	2400	3600	**7200**
	Sesquiplicarius	3600	5400	10800
	Duplicarius	4800	7200	14400
Eques Legionis	Basic	2800	42000	**8400**
	Sesquiplicarius	4200	6300	12600
or alae	Duplicarius	5600	8400	16800

As discussed earlier, Speidel accepts that Septimius Severus' pay raise was 100%. But Speidel admits that if there were an unknown pay raise in between, or I would note less or more than 100%, then his proposed table is difficult (365). As a result of these concerns, of all Speidel's proposed pay scales, I find the auxiliary pay for the Third Century most troubling so far. I am more certain of the table for the auxiliary pay for the First and Second Century, especially with the newly included evidence. The possible discovery of further material evidence might help to clarify the situation and give us a better idea of what individual Roman soldiers in the auxilia were paid in the Third Century AD.

e. The 5:6 Rule

Alston and Speidel also differed on whether Rome paid the auxiliary and the legion the same rates. Speidel advocates a 5:6 ratio between the two in favor of the auxiliary, but Alston and other scholars reject that such a differential exists. Because he does not accept Speidel's projections on later individual later pay amounts, Alston works with "minimum figures" to support his argument that such a differential does not exist. He uses the documentary evidence to create minimum amounts of pay from before the Domitian pay increase to challenge the 5:6 rule (120). Looking at those documents that show stoppages, Alston assumes that that the state would not pay its soldiers less than it cost for their supplies, when he concludes that an auxiliary infantryman made at least 175 denarii in order to meet his deductions. He then calculates cavalry pay, but he has to speculate as to the cost of supporting a horse. This allows him to conclude that an auxiliary cavalry soldier was paid at least 225 and probably 275 denarii to avoid debt. Although Alston seems to then argue that a pay differential originally exists, he concludes that it does not because some soldiers transferred from the legion to the auxiliary, and they would not do so if it meant less pay (122). He argues as Rome acknowledged the value of the auxiliary over time, it began to treat them equally. Alston supports his argument because soldiers were recruited from the same social groups, and Roman citizens joined the auxiliaries and non-citizens joined the legions. Thus, Alston acknowledges the conventional wisdom that pay disparity existed, but he concludes that this is wrong. I agree that Rome began to pay the two groups the same as time went on. In the early Third Century AD, the distinction of non-citizen was removed. Caracalla issued a decree making everyone who was in the Empire who was not a slave a citizen. This might, however, be more reflective of Caracalla's need for money because citizens had to pay more taxes than non-citizens, so this increased Rome's tax base, rather than a suggestion that

Rome became more accepting of non-citizens. Also, I argue against Alston because the main value that Rome placed on the auxiliaries was that they would fill in the gaps of the Roman army's weakness. For example, Rome relied on auxiliary cavalry because they did not have a tradition of a strong cavalry, so they were not very good at it. Similarly, Rome tended to use auxiliaries as archers, slingers, javelin men, skirmishers or missile troops because Roman citizens looked down on range weapons because they said they were not manly enough.

Speidel uses his projected pay levels to support the 5:6 ratio in pay differential and turns to the papyri evidence as support.[32] He starts with the three papyri that reflect lump sums sent to pay entire units, P. Panop 2,36ff, P. Panop 2,292f and P. Panop 2,57 (351), of 73,500 denarii (294,000 sestertii), 65,500 denarii (262,000 sestertii) and 343,000 denarii, respectively for disbursement to the different units of troops. As discussed earlier, no details are provided in the papyri as to how many soldiers in each unit were paid from the amount or their ranks. Yet, as Speidel notes, only RMR 70 clearly applies to an auxiliary (353). Relying on the earlier assumptions by Fink, who read the *stipendia* for RMR 68 as 247 ½ and not 248 drachmas, Speidel concludes that a full *stipendium* of 250 sestertii would apply to the auxiliary in RMR 68 and 300 sestertii for the legionary based on these papyri. Thus, Speidel argues that when calculating the *miles cohortis*' (non-citizen soldier) basic pay and *miles legionis*, his numbers neatly fit the 5:6 ratio. This made sense to him because the late Roman historian, Vegetius, showed in *Epitoma Rei Militaris* (*Veg. Ep. Rei mil*. 2,221) that the legions' cavalry received more basic pay than the regular basic foot soldiers. I also throw out a simple explanation to reconcile the two salaries: the higher one was for cavalry which had to pay for the upkeep of its horses. Using Alston's assumption that the state would never pay the military less than it cost to pay

[32] He uses conversion rate of 1 sestertius, 1 drachma equals 7 obols or 1 denarius equals 28 obols per footnote 11. But in footnote 14, he mentions that there were "fluctuating currency exchange rates."

their supplies, if the cavalry had to pay the extra expense of taking care of and feeding their mounts, that could explain the difference. He notes that it took several years as a foot soldier to get promoted to the equestrian *stipendia* (357). So according to his figures, it would make more sense that a legion foot soldier would receive more than an auxiliary foot soldier. He notes, however, that R. Marichal rejects this because RMR 70 creates an "odd figure" of 84 denarii 15 ¾ obols. Marichal also indicates that ChLA 446 and 495 had seemingly inexplicable figures: 257 denarii 22 and ¾ obols and 257 denarii 22 and ¼ obols (352). Speidel states that Jahn tried to rectify these odd amounts and calculated a salary of 1,025 sestertii for the auxiliary in RMR 70 before Septimius Severus' pay raise. But Speidel acknowledges the number still did not work, because if that was applied to ChLA 446 and 496, it created a "supernumerary of 25 sestertii and 125 sestertii" respectively for ChLA 446 and 495, which Jahn suggest were "bonuses of some kind" (353).

Speidel says that Fink "improved the reading of the *stipendia*" for RMR 68 by changing the accepted number to 248 drachmas (with it equaling a sestertius) to 247 ½ (352). Speidel concluded that both RMR 68 and 69 show a full *stipendium* of 250 sestertii and 300 sestertii, respectively, if the standard 1% is deducted so that RMR 68 was auxiliary pay and RMR 69 was legion pay. Thus, he argues respectively it matches the legionary pay in the literary evidence, showing a 5:6 ratio of auxiliary to legion pay. Speidel endorses this pay scale "because it can [help] explain transfers of soldiers from legions to the auxilia without having to assume pay cuts or punishment" (ibid). Despite these weaknesses, Speidel holds firm to his projected salaries as correct for the late Third early Fourth Century AD pay scales and then confirms that a 5:6 ratio of pay between an auxiliary and a legion foot soldier existed during the period which helps to support his pay scales (371).

I support Speidel's 5:6 rule and I turn to Rome's class-based society and its ethnocentricity to argue that it was unlikely that the Roman army paid the legion and the auxiliary equally. As Alston notes, legions came from the Roman people, and the ancient literary sources treat the auxiliaries and legionaries differently (122). Furthermore, noncitizens did not have the same privileges as citizens under Roman law. These could be extreme in cases of crucifixion or being disenfranchised to vote in state elections. Given Rome's inherent prejudice against non-citizens, it would be unlikely that the Empire would treat the two equally. As to Alston's claim that this subsided over time, I point to Rome's widespread antisemitism and continued prejudice against different groups, as well as the rise in anti-immigrant sentiment from the fourth century onward, as evidence that Rome never was an accepting society.

Thus, based on the arguments and Speidel's use of the material evidence, in addition to my own research on Roman culture, although I am not sure of the exact ratio, I would support a differential in pay between the auxiliary and the legionary as evidence of Roman class prejudice. This further reflects Rome's view of the value of the auxiliary as a means to an end rather than a part of Roman society. Even when it started to treat the auxiliary equally Rome did this just to enrich itself. This benefitted the state the most as a way to gain more income, but it also reflected Rome's class prejudice because the group of original citizens benefitted off of the backs of the new citizens, the auxiliary, whose contribution to taxes meant that the original citizens did not have a tax increase.

f. The Higher Auxiliary Pay Scales

According to Goldsworthy, "The pay received by officers of all ranks in the legion is not known with any certainty" (94). If calculating soldiers' pay for legionaries and auxiliaries has challenges as suggested above, then analyzing the higher military pay scales without literary, and

limited documentary evidence is even more of a challenge. Yet, Speidel notes that "the Roman army had a great many ranks and functions below the centurionate but only three different pay grades: basic, pay-and-a-half, (sesquiplicarius) and double pay (duplicarius)" (371). He turns to Roman gravestones to support his arguments on individual pay at the highest ranks of the Roman army.[33] Speidel notes that in the early Empire, there is evidence of treble pay (triplicarius) on the gravestone of Antiochus, son of Antiochus found at Mainz (ibid). According to Speidel, the soldier served as an "*eques alae Parthorum et Araborum* and was then asked to stay with the army as an *evocatus triplicarius* (ibid) Yet, per Speidel, "no further evidence of this pay grade exists after the mid-first century AD, so it may have been abolished" (ibid). Speidel cites P.A. Holder's confirmation of treble pay for the "post evocatus" for C. Julius Macer, *duplicarius alae Atectorigianae*, before becoming *evocatus* in charge of 600 *Raeti gesati* during the first half of the first century AD (ibid). Per Holder, this promotion included a pay raise. Speidel argues that the *evocati* "may later have been paid the otherwise highest pay rate below the *centurionate*, double horsemenen's [*sic* horsemen's] pay, the rate of a *cornicularius*" (ibid, n. 105). Speidel notes that this is supported because "legionary centurions were often appointed from those two ranks of the praetorian guard" (ibid). Speidel projects legionary centurion pay from P. Panop 2,197ff: for a *praepositus equitum promotorum legionis II Traianae* was 1,800 denarii for the *stipendium* of the first of January A.D. 300 or an annual pay of 54,000 denarii. Speidel cites P. Oxy 1047 which shows "the September *stipendium* of a *praepositus* of an unknown unit of 36,000 denarii [which is probably a translation error meaning 'men'] i.e. 108,000 denarii or 432,000 sestertii" annually (372). Speidel notes that "although the title *praepositus* is of no help in determining exact rank," Jahn concluded both were "centurions for they received donativa of

[33] Speidel cites AE 1976 for the material evidence of the tombstones.

twice the amount of normal soldiers" (ibid). Speidel concludes that higher ranking officers received a 30:1 and 60:1 pay ratio, respectively, compared to the basic legion pay (ibid). Using that ratio, Speidel relies on Jahn who estimates their ranks at *centurio primi ordinis* and *primuspilus* (ibid). Speidel writes that the highest paid rank known, the centurionate, the *evocatus Augusti* of the praetorian guard, who guarded the emperor's bedroom, received treble pay at least during the first half of the First Century AD (ibid). Thus, Speidel establishes the inordinate pay of those who rose to the highest ranks including those who were promoted to the emperor's personal guard.

Speidel then calculates the pay of high-ranking centurions. Noting the "army's strong tendency to follow tradition," Speidel estimates praetorian guard basic pay in the early Empire as 1,000 sestertii per *stipendium* or 3,000 sestertii annually. He also estimates that the *evocatus* would earn 9,000 sestertii (373). He notes that soldiers were frequently promoted from this rank to the legionary *centurionate* during the First through Third Centuries AD (ibid), and he estimates a minimum salary of a legionary centurion during the early Empire at around 9,000 sestertii (which would allow an increase when promoted to centurion). Using the reconstruction of a centurion's salary based on a 15:1 ratio for basic pay, Speidel estimates that one would receive 13,500 sestertii per year (or 1.5 times the pay of the *evocatus* or 4.5 times the basic pay of a regular legionary soldier's basic pay) and based on that creates table 5 on page 374, recreated here (again, bolded figures are based on evidence):

Rank	Augustus	Domitian	Severus	Caracalla	Max. Thrax
Centurio legionis	13500	18000	36000	54000	108000
Primus ordo	27000	36000	72000	108000	**216000**

Primuspilus	54000	72000	144000	216000	**432000**

Although Speidel also calculates the individual salary of equestrian officers as commanders of auxiliary units or junior officers in the legion, I am not including that table here, because very little is evidentiary based. Speidel uses his calculations on this as further support of Second Century "career patterns" and salaries (374).[34] Using these possible paths of promotion and based on one example of someone who wanted to become a *centurio legionis* but did not get it, Speidel concludes that the *militia prima* could have been paid the same or even a little less than a legionary *centurionate*. He calculates this as 54,000 sestertii, based on "the only known sum to have been paid to an equestrian officer as salary (375).[35] Yet, Speidel acknowledges that such pay is not supported by a multiple of his proposed basic pay grades (ibid). He concludes that the cavalry had a paygrade of its own and acknowledges it would be futile to speculate on what those salaries would be (376). Speidel asserts that there is no documentation of the remaining important ranks for *centurio cohortis*, *decurion cohortis*, and *decuroio alae.*

All of this confirms the concerns of Adrian Goldsworthy in *The Complete Roman Army* that, such "oddit(ies) should warn us against generalizing about pay from a tiny sample of specific documents" (95). I join in his sentiments. While Speidel's article comprehensively cites other scholars' work, he acknowledges the surprisingly little clear evidence of individual Roman military pay, especially for the auxiliary and especially for the higher pay scales. To ensure more confidence in those numbers, the scholarship will need to wait for the discovery of more supporting documents, such as better ledgers or accountings, to help to resolve these issues with

[34] Speidel cites Brain Dobson's scholarship on the relations of cavalry officers and centurions' careers in footnote 121.
[35] This is quoting H.G. Pflaum *et al*, footnote 24.

certainty. Despite this, Speidel's calculations, including the higher pay scales tell us that Rome had to pay substantial amounts to its soldiers, especially its officers annually.

4. Deductions

Several pieces of the documentary evidence that scholars rely on for discussions of military pay include entries for deductions or stoppages. At first, the pay documents show an itemization of the deductions of each soldier's pay, according to Speidel (365).[36] Later, all of the soldiers in the unit were included on one ledger, which reflected current pay and deductions for each. At one-point, long lists of itemized deductions disappeared, and the only standard deduction that was itemized on pay records was *collatio*, or taxes (RMR 70); *contulit publico*, or tribute money (ChLA 495) or *sublatio* (a generic word for deduction or removal) (ChLA 446, 473) (Speidel 1973, 365). Per Speidel, as time went on, soldiers no longer had to pay the government for their living expenses (ibid). As he wrote,

> If they were still connected to the supply system, these small deductions could only have represented a compulsory contribution towards the financial upkeep of its logistic organization and no longer covered the costs of hay, barely, food, boots and socks. Whatever the exact nature of these stoppages, it is certain that deductions were gradually reduced (365).

According to Speidel, by the late 170s AD, the Roman state began to pay yearly contributions to the cavalry's horse feed (366) (e.g., *faenaria/hordiaria*) or expenses *victum/sumpturarium)* (365, n. 73). I classify these expenses or stoppages into three major categories of: (1) 1% overall deduction (2) in-kind pay and (3) line-item deductions for soldiers' supplies. This section will explore those in detail and suggest new ideas for the scholarship on their purpose and effect.

[36] Speidel looks to ChLa 446, 473, 495 and notes "several considerable changes in the accounting systems."The ledgers no longer contain all *stipendia* of one year under the soldier's name. A new roll was made for each *stipendium*, and this was a continuous list of all the soldiers' accounts (RMR 70) (265).

a. The 1% Deduction

The 1% deduction was a regular deduction that removed 1% of a soldier's pay before he received it. Speidel claims that non-fragmented records show such a 1% deduction "even before it was accredited to the soldier" (359). Scholars differ on the 1% deduction's purpose (ibid n. 50). Speidel acknowledges M.P. Speidel as the first to recognize this deduction and he believes it was an exchange fee for converting denarii to drachmas—a theory he said is supported by Adrian Goldsworthy (ibid). Yet, Alston notes that RMR 70 includes a 1% deduction, but it was not a conversion fee, because RMR 70 shows the soldier was paid in denarii and obols (116). Per Speidel, G.R. Watson suggests that it was a service charge for bookkeeping but gives no evidence that any other part of the Roman government used money from the source to pay for its bookkeeping charges (359 n. 50). Speidel cites Jahn, who said it was for "an institution or purpose benefiting all soldiers of the unit" (ibid). Yet, several of the known pieces of material do not reflect it, or at least do not specifically show it.

I argue that the 1% deduction was not a general contribution towards common camp expenses, because those are specifically listed—such as the deduction in RMR 69 for a contribution towards the camp's Saturnalia (*saturnalicium kastrense*) celebration. My argument is further supported by Speidel's indication that the Roman soldiers made contributions to the legion's burial club (*ad signa*) (360) and even for their tents (*tentoria) (Tacitus Ann.* 1,17). If the camp was already receiving the sizable sum of 1% of all soldier's pay for common expenses, then why would it need to nickel and dime the soldiers for contributions toward their holiday party or burial club? I believe that the 1% deduction was more likely part of the benefits the government gave to itself as it administered the army. Similar to the overhead awarded in grant funding today, the value of 1% deduction of all military pay during this period would be a

sizeable amount that the Roman government kept to fund its general operations or even public games—but off of the backs of the soldiers fighting to make Rome successful. This would be more in keeping with Rome's culture of corruption and would be a further indicator of how little it valued its army.

b. In-Kind Pay

Although not a deduction, during some periods, soldiers paid for their expenses or goods—or rather, did not have to pay for them—through in-kind payments. Before the First Punic War, the Roman army consisted of volunteers and soldiers were required to pay for their own equipment and supplies. Before the Marian reforms, a soldier's socioeconomic status determined one's class, such as foot soldier or cavalry and Rome created the census to make that determination. The richest served in the cavalry because they could afford to provision a horse, and the poorest were the skirmishers. But the poorest of the poor did not qualify for service and were exempt. Thus, in the earliest iterations of the Roman military, the goal was that a soldier was not unduly burdened by their military expenses and Rome did not pay for them,

By the First Punic War, the Roman military realized that it did not meet that goal and that soldiers' financial situations were unstable, so the military started to pay them. Yet, some Roman citizen soldiers would return from war in financial ruin because of their high military expenses, which continued into the Second Punic War. In contrast, by the Second Punic War, the Roman government gave its allies free food, rather than payment, according to Polybius (vi. 39.12f). Yet, it took a long time for the Roman government to provide any in-kind payments to its own troops.[37] When deductions for soldiers' expenses became onerous, over time, the Roman

[37] Although beyond the scope of this paper, there is evidence of in-kind and other payments to soldiers. For example, according to Speidel's reference to Van Berchem in footnote 99, "if the supplies in kind did not suffice, the difference was paid in cash". He uses this to perhaps explain the different numbers in ChLA 446 and 495. Also, soldiers were paid upon discharge. Citing Suetonius (Caligula 44), when Caligula was inspecting his troops on the

government started to give in-kind payments to subsidize Roman soldiers' expenses. By the Fourth Century, Speidel notes Jahn's claim that soldiers even received free rations for their servants (366). Soldiers would also look to relatives for supplies, rather than buy them from the government. Speidel cites Jahn for examples of soldiers obtaining food, clothes and weapons through their relatives by the early Second Century (366).[38] There were no pay raises from 84-197 AD, but deductions from soldiers' pay were gradually reduced with ever-increasing government contributions to help offset the impacts of the lack of additional pay.

c. Deductions for Supplies

In contrast to the regular and recurring general 1% deduction discussed above, many of the historical documents refer to deductions for soldiers' supplies, which the Roman government provisioned them with. Roman soldiers had to pay the state for their supplies at the cost of 80 drachmas/sestertii as RMR 68 details (360) and 100 drachmas in RMR 69. Rome charged the soldiers for the cost of their boots and socks (*caligas* and *fascias*) and clothing (*in vestimentis*). For example, Speidel's footnote 49 refers to *Tacitus Ann*. 1,17, where he reports deductions for *vestis and arma* (359). Speidel also notes some examples of deductions for repair of armor and helmets, along with servants' food (365). Speidel indicates charges for boots and socks, as a yearly deduction of seven denarii taken over the course of one year. Interestingly, as he notes, this is less than RMR 68's deduction for *caligas fascias* (sandals and socks) for nine denarii (36 drachmas) annually, which he attributes to riders needing less boots than the infantry would need

Rhine in early AD 40, Suetonius said that Caligula decreased the discharge money (*commoda emeritae militiae*) on the *primipili* down to 600000 sestertii (n. 116). Suetonius argues that the emperor gave that money *pro gradu cuiusque* (Div. Aug 49.2) (374). If basic legionary soldier's salary was 1,200 sestertii, then this caused a reduction of 1 to ½% [the author contends that the army would have hated this reduction, and that Claudius would rescind it] (ibid).

[38] He cites the papyri and ostraca to provide some evidence (n. 78).

sandals, based on wear. Cavalry deductions per *stipendium* included hay money or *faenaria,* Speidel also distinguishes RMR 68's stoppages for barley (cavalry horse food) versus hay (pack animal food) (363). Many of these types of deductions are included in RMR 68 which refers to the *stipendium* of Q. Iulius Proculus from Damascus who received pay of 247 and a half Alexandrian drachmas. From this, the Roman government deducted from his three payments, expenses including 12 drachmas for shoes, 80 drachmas for food for himself and 10 drachmas for hay. C. Valerius Germanus of Tyre had similar deductions from his three *stipendia*, but he also had a deduction of 100 drachmas for clothing (RMR 68). As Goldsworthy notes, in the third *stipendium*, both men paid 145.5 drachma for clothing, "which suggests that certain items were issued annually in the expectation that they would wear out in this time" (95). Goldsworthy also notes that both paid for hay, but he thinks that they were not cavalry. He suggests that this was for a common camp mule or even to be used as bedding (ibid)[39]. Similarly, the Masada pay scale reflects deductions for food of 20 denarii, boots of 5 denarii, leather strappings of 2 denarii, linen tunics of 7 denarii and barely of 16 denarii (P. Yadin 722). Goldsworthy notes that the stoppage from food was standard at 20 denarii in both locations, as was the barely food for pack animals.

The earlier discussion focused on soldiers' gross pay, but that amount was not put into the soldiers' pockets because what they actually received was often minimal or nothing at all. Speidel cites J. Remesal Rodriguez, who wrote, "because of the many deductions from the soldier's pay, hardly any money actually changed hands" (364). Similarly, in *The Logistics of the Roman Army at War*, Johnathan P. Roth notes that such deductions were "of course, only a bookkeeping device, and the actual costs of the grain was paid out by the Roman state" (223). Looking at the Masada pay slip, Steven J. Thorne of the Royal Canadian Legion's magazine,

[39] If this is true, it further supports my earlier argument that the 1% deduction was not for common camp expenses.

Legion, wrote that this "suggests little has changed when it comes to the army, the fighting man and unfair labor practices." He continues that the "1,900-year-old pay slip…shows that the imperial grunt was left penniless once the military recouped expenses for meals, equipment clothes and even horse feed" (Thorne, 2023). In his *Annals*, Tacitus' writes that the troops in Pannonia mutinied and said that "in fact military service was burdensome and unprofitable; they valued the body and soul at 10 asses a day, from that clothing, weapons and tents had to be purchased...".[40] When stoppages were deducted, the soldiers, especially those at the lowest pay scales were often left with a minimum payment.

The fact that the government deducted the cost of the soldiers' supplies after the Mariam reforms is not surprising, but as these scholars note, perhaps the total cost to the soldier that they reflect may be. First-century soldier pay records show that before 84 AD after the standard 1% deduction, 80 drachmas were taken for food (360). RMR 69 states that the number increased to 100 drachmas after 84 AD. As Speidel notes, total deductions amounted to about "40% of the foot soldier's basic *stipendium*" by later in RMR 68, the deductions amounted to three-fourths of the annual pay of the two auxiliary soldiers (360).[41] Similarly, RMR 69, while missing a lot, shows that for the first *stipendium* about 75% was withheld for deductions, and the next two show deductions of 50%. (361) if P. Yadin 722 is read as a ledger like Speidel advocates. Most concerning is the fact that the soldier's pay of 50 denarii was reduced by, as Alston refers to them, the "standard camp expenses," which also totaled 50 denarii. Thus, the soldier's pay is

[40] He continues that they complained about the further financial impact of having to bribe the centurions (Loeb edition, 276). I note that Goldsworthy miscites Tacitus' discussion of the troops along the Rhine frontier who mutinied after Caesar's death because they, too, wanted higher pay and to have Germanicus appointed emperor, but they did not specifically mention the burden of stoppages (95).

[41] Speidel and some other scholars surmise that the small amount that was left after reimbursing for provisions went into a soldier's account/depositum, which the author suggests involved separate bookkeeping (360). I take it he means that this functioned like today's savings accounts. Yet, in an era without modern computer records, it would take sophisticated and universal record keeping for this financial information to travel back to a central account or the soldier's families, or even to move it from camp to camp.

used up by his expenses and no money was paid to him (352). The document shows the same net zero pay for the third *stipendium*, too, as the amount paid exactly meets the soldier's camp expenses.[42] Given the amount of debt created by stoppages that sometimes left the soldier with no pay, it is hard to agree with Speidel's statement that "the Roman soldier of the first century AD was well taken care of" (364). True, their basic necessities were provided for, but at what cost? The evidence suggests that the average infantry soldier was treated more like an indentured servant than a professional. This is most tellingly evidenced by this examination of the deductions that were taken from the soldier's *stipendium* to cover his costs, which often times left him with very little pay. As Thorne suggests, Rome's practice of charging at least its lowest rank soldiers as much for supplies as it paid them reflected how little they valued them.

5. Income Inequality

Similarly, even using speculative figures for the salaries of Rome's highest ranks, one cannot ignore comparisons to modern economic concerns of socioeconomic disparity between the foot soldier's pay and those at the top of the military hierarchy. Speidel estimates that difference at about 300 to 200,000 sestertii. Such drastic differences in pay are a telling statement on how Rome valued its infantry.

Although applying modern economic theory to earlier times is speculative, the substantial differences in pay raise the question of what were the impacts of income inequality on the Roman military? The earlier discussion of stoppages shows that Roman foot soldiers had little or sometimes nothing left from their four months of pay. Because Rome used standard deductions, comparing what the foot soldier had left in his pouch to that of an officer further illustrates the

[42] As discussed earlier, this raises a conflict on the translation issue for the language entered after "*accepi stipendi"* (n. 59). Alston argues that some people read this as "I received from my pay," which implies that there are other sources of pay. Speidel, however, reads it as "I received my pay," meaning the entire thing—not just part of it. Thus, I support Speidel that it was the full pay, which is probably a better translation as discussed above.

impacts of such income inequality in the military in ancient times. Speidel helps to illustrate this in his individual pay calculations. According to Speidel, prior to 84 AD, the year of Domitian's pay rise, Roman foot soldiers were paid between 250 to 300 sestertii each pay day as their basic pay. Or, according to Alston citing Polybius 9vi. 39, 12f.), about 3 asses per day (114).[43] Speidel claims that the auxiliary decurions and centurions may have been paid five times that of infantry soldiers. Legionary centurions could have been paid 15 times the basic *stipendium* and the top-ranking centurions as much as 30 times the foot soldier's basic rate. A *primuspilus,* or the legion's senior centurion, might have received twice that amount, or, during the Second Century, AD 72,000 sestertii per year. Centenarian procuratorship could have earned 100,000 sestertii annually. As Speidel suggested above, more outrageous is a senatorial commander of a legion, who could have earned more than 200,000 sestertii annually compared to the foot soldier's meager pay of at best 900 sestertii.

What does this tell us about ancient Rome? It reinforces the perception of the inequities created by the hierarchies of its society. Like other parts of Rome's society, military culture was hierarchical. This shows that the average soldier at this time was not valued, with a pay difference of 125:1 or more. Of course, compared to today's average CEO of a U.S. S&P 500 company who makes 324 times the median worker's pay with an average compensation of $18.3 million in 2021, some may argue that ancient Roman income inequality is low.[44] Yet, one cannot look at this Roman pay system and not question the quality of life for the rank-and-file Roman military. This is most telling when examining how much of that pay the soldier actually received

[43] Polybius' payment of two oboloi per day to the legionary infantry. (CI. 39 12f) (114) This is the same amount as both jury pay and the disabilities pension in democratic Athens, as noted in *Disability in Antiquity* (Rose, 2017, 172). This was less than the pay of an unskilled laborer.

[44] See Rainey, 2022; "The age of 'greedflation' is here: See how obscene CEO-to-worker pay ratios are right now" (https://www.fastcompany.com/90770163/the-age-of-greedflation-is-here-see-how-obscene-ceo-to-worker-pay-ratios-are-right-now#:~:text=Its%20annual%20Executive%20Paywatch%20Report,264%2Dto%2D1).

after the Roman government took deductions from his *stipendium* to cover costs of living as discussed above. While the prospect of holding a government job might have been enticing to many from Roman society's lower ranks, in reality, it appears that the military system reinforced socioeconomic inequality rather than mitigated it.

Whether by design or by the power structure that allowed it, the Roman military helped to solidify the hierarchy of ancient Rome. If not killed first, many soldiers stayed in the military just long enough to meet their mandatory term of service of 20 years and retire. Few would continue to devote their entire life to a military career that may allow them advancement in the ranks. From the military perspective, foot soldiers were probably in the classes that included unskilled labor, at least after the Marian reforms. Yet even the foot soldier knew there was someone less valued monetarily, and that was the slave class who received nothing. Evidence of income inequality in ancient times demonstrates how difficult life was for much of Roman society.

6. The Cost of War, Not Individual Pay

Despite classical scholars' detailed attempts to calculate army pay, inconsistencies remain—especially for auxiliary and officers' pay—and as discussed above, the numbers get fuzzier in later periods. Even if there was confidence in those numbers, the cost to Rome in paying the military remains unclear because we do not have certainty as to the number of individual soldiers or their ranks. If my line of inquiry is the impact of military pay on Rome's economy, without duty rosters of the numbers of troops and their status within the legions, then knowledge of individual pay is not the only way to explore this issue. Instead, to assess the impact of paying the army on Rome's economy, we would be better served by knowing how much Rome's total line-item budget was when all of its soldiers were paid.

Duncan-Jones' attempt to determine Rome's budget is useful in suggesting Rome's cost of paying the army as a whole. He proposes two approaches in attempting to calculate the cost of the military during the Empire. One calculation was to determine the number of units actively serving in the army and multiply that with the rates of pay. For the salaries, he relies on Speidel, as discussed in chapter 1, and P.A. Holder as noted in Duncan-Jones' notes for table 3.1 on page 34. In table 3.1, Duncan-Jones uses Speidel's base salary of 1,200 sestertii (or 300 denarii at a four to one conversion) in 200 AD as his unit of calculation. As discussed in chapter 1, this number is one of the bolded numbers on Speidel's pay scales showing it is supported from the known evidence. Using this as the base number for legionary infantry pay Duncan-Jones then estimates the number of soldiers at various levels and calculates the cost of their pay based on the estimated equivalent number of legionary salaries, in effect using Speidel's figure of legionary pay as the reckoning unit. Duncan-Jones bases the standard legionary salary on sestertii because as he said Roman writers used it because it was the traditional unit of reckoning. Using Duncan-Jones' numbers, I instead calculated the total cost for each group using sestertii not the legionary pay unit and then I converted it to denarii because that is the coin that Rome used to pay soldiers as discussed below. Duncan-Jones starts with the number of active units of 33 legions of 5,500 men or 181,500 soldiers being paid 181,500 legionary salaries.[45] Multiplying Speidel's base legionary salary times 181,500 totals 217,800,000 sestertii or a total cost of 54,450,000 denarii to 33 legions. He then estimates 47,900 auxiliary cavalry and then, per Speidel assigns them the same salary as a regular legionary soldier for a total of 57,480,000 sestertii or 14,370,000 denarii. Duncan-Jones uses Speidel's 5:6 rule to calculate the salary of the estimated 176,240 auxiliary infantry for a total salary of 176,240,400 sestertii or 44,060,100

[45] According to Duncan-Jones in his note to table 3.1 his "figures for auxiliary strength come from A. R. Birley's estimates for AD 150, using Holder 1980 (Birley 1981B, Table 5; Holder 1980.)"

denarii. He then uses a rough estimate for the size of different units stationed in Rome, such as the urban guards and the praetorian guards, plus the size of the navy and calculates those as comparable to a total of 40,000 salaries for a total of 48,000,000 sestertii or 12,000,000 denarii. He factors in a further 20% pay increase for officers based on estimates by Tenney Frank and A. Domaszewski to total 99,903,600 sestertii or 24,975,900 denarii. Totaling the number of legionary salaries as Duncan-Jones did in table 3.1 or based on my calculations of that cost makes a grand total of 599,424,000 sestertii or 149,856,000 denarii for Roman military salaries in 200 AD. Johan van Heesch supports Duncan-Jones' calculations of the astonishing cost of paying the Roman military is in his book chapter, "Some Aspects of Wage Payments and Coinage in Ancient Rome, First to Third Centuries CE." In contrast, according to van Heesch, "Duncan-Jones estimates the budget for civilian employees at 75 million sestertii in the early part of the third century, a figure only one-sixteen of the military budget" (80). These payments of hundreds of millions of denarii to fund Roman military wages were staggering amounts for those times.

Although Duncan-Jones' research was focused on the cost of the military before Septimus Severus and Caracalla gave the army a raise before the Crisis of the Third Century, his notes allowed me to calculate the cost of Rome's military in the Augustan era. According to table 3.2, the cost of legionary pay per head was 900 sestertii before 84 AD. Duncan-Jones suggests relying on Tenney Frank and K. Hopkins' research to estimate the cost equivalent of 420,000 legionary salaries at this time. This totals 378,000,000 sestertii or 94,500,000 denarii for Rome's estimated total army cost. Again, a payment of tens of millions of denarii at this time was substantial.

Yet even Duncan-Jones has reservations about the specifics of these amounts when comparing them to his second method for calculating Roman military pay, which was to rely on Cassius Dio. In Dio's *History*, he estimates the cost of Caracalla's raise at 280,000,000 sestertii or 70,000,000 denarii. According to Duncan-Jones this calculation differs from his own, above, by about 30%. Duncan-Jones notes that if Dio's writings are true then there had to be substantially less soldiers in the army at the time than scholars have estimated. I also think Duncan-Jones is suggesting that this was even more implausible because of the size of Septimus Severus's pay raise, which was given only a few years earlier. If, as Dio said, this was the biggest raise the army ever received during the Empire, then he suggests that legionary salaries could be even higher than the 2,400 sestertii per head used in table 3.2. Duncan-Jones tries to reconcile these concerns by arguing that Dio's estimate of Carcalla's pay raise only refers to "less than the whole army" (1994, 35). He then reduces the large discrepancy to a 10% difference by arguing that Dio's estimate did not include officers. I agree with Duncan-Jones that would be unlikely. As Duncan-Jones concludes, this is further complicated because Dio said the number was "over 70,000,000" and how much over that is not known. Despite the inconsistencies, even then, the cost of paying the military in the tens of millions of denarii was monumental.

Michael Crawford also estimates the total cost of Rome's paying its military as part of his research to calculate Rome's total budget. In *Roman Republican Coinage,* Crawford uses material evidence to calculate Rome's budget while cataloging different coins from the Roman Republic based on different finds, especially from hoards. In so doing, Crawford argues that Roman coins were made for state expenditures (617). He posits that there would be a correlation between the number of coins made per year and the amount of the state's expenses (617-8). But

he cautions that this would be impacted by whether payments were regularly made in new coins. Crawford notes that the costs of such a major expense as the military provides important evidence in his attempt to recreate Rome's economy. Crawford's research shows that Rome mainly minted coins to pay its military during the Republic. He relies on Roman Republic coins as one of his two lines of evidence, which he says were issued for the purpose of allowing Rome to pay its expenditures, predominately the military (698-699). Crawford attempts to specify the yearly costs of at least two legions in the late Republic. Although he is uncertain of the exact costs, when writing the details of the issue of C. Annius' legionary coins, Crawford estimates the cost of the minimum two legions for a year as 3 million denarii (694). He later uses this large number again to calculate the cost of the army "at most 36 million denarii," which paid 24 legions costing 1.5 million denarii each (695). Crawford says that this already high expenditure increased for the Third and Fourth centuries BC (697).[46] He sets forth his evidence in table LVIII, where he relates Rome's total military spending to the number of denarii produced. It shows that in the Third Century BC, the cost of financing the Roman military stayed relatively stable between 2 and 3 million denarii. But by the Third Century BC, that rose to the highest point of about 25 million denarii (702). Crawford says that the "volume of coinage and estimated army expenditure on the whole run parallel" (703).[47] Crawford's research shows a correlation between the coins Rome minted and paying the military. This reliance on the costs associated with war in determining Rome's economy suggests that paying the military was a major expense, if not its largest amounting to multi-millions annually.

[46] As discussed earlier, Crawford blames this on the reforms of the Gracchus brothers.
[47] Crawford notes that there were occasional surpluses and even fewer deficits, which he explains by possible low estimates of the size of issue, or wars ending mid-year causing less pay etc. But that all changed when the treasury was shut down during the civil wars at the end of the Republic.

Crawford's research is most helpful to my inquiry of how much Rome paid its soldiers when he continues his die analysis after the First Civil War to determine the number of coins Rome minted. For example, Crawford notes that "864 obverse dies would produce about 25,920,000 denarii, enough for only one-third of a year's pay for 23 legions at post-Caesarian rates" (671). Thus, one *stipendium* for a legion cost 1,126,956 denarii after Caesar's raise, or 3,380,869 annually. Similarly, Crawford writes that, "the issue of C. Annius was presumably used to pay the two legions (at least) which he commanded for at least a year; their cost may be regarded as over 3,000,000 denarii, in this period" (693). Assuming two legions, that would mean they were paid about 1.5 million denarii per legion per year (and if there were more, it would be even less). This is half of what was quoted post-Caesar, above. In discussing concerns about embezzlement after 62 AD. Crawford writes that Rome's "revenues in theory (were) worth 135,000,000 denarii a year" and estimates that "the army (was paid) at most 36,000,000 denarii (24 legions each costing 1,500,000 denarii), making a total of 63,000,000 denarii" (695).[48] Most concisely, Crawford includes tables that estimate the cost of a legion from 157-50 BC (698). Crawford summarizes the table and his first estimate of the partial costs of the Second Punic War by Scipio in 210 AD was 2,400,000 denarii, which he suggests is "perhaps a year's pay for the four legions in Spain" (696-7).[49]

Crawford details his rough estimates for his calculations based on P.A. Brunt's calculations of the sizes of legions in *Italian Manpower 225 B.C. – A.D. 14 (418 and 671)* (696). He estimates that Scipio had about 4,140 legionaries, which each received 108 denarii (for a total of 447, 120 and 60, respectively) which he broke up into 60 centurions at 216 denarii each

[48] Crawford cites Plutarch, *Pomp. 45, 695* and Cicero, *Sest.* 55. He notes that Rome paid the corn-dole for the poor in the amount of 27,000,000 denarii of that total and used the remainder for paying the army (695).
[49] Crawford looks to Polybius for the figure that Scipio brought 400 talents (Loeb Edition, 167).

(which equals 12,960 denarii) and 200 cavalry at 324 denarii (at 64,800 each, totaling 524,880) (ibid). Then, as he transitions to the First Century BC, Crawford notes there was an "enormous rise in the cost of a legion" (which he says really increased in price during the two hundred years). He begins with calculating the cost of a legion as 1.5 million denarii before Caesar's pay raise. Then, he calculates the cost of Pompey's army and cites Brunt that Pompey raised 24 legions in 67 BC, which was about 120,000 men "and he was allotted 36,000,000 denarii" (ibid). That means that a legion had on average 5000 men who were paid 300 denarii each annually. He calculates the costs of Piso's army at 4.5 million denarii for the year 57 AD, and he presumes he had three legions (ibid). For Ahenobarbus, he calculates the cost of 1.5 million denarii in 49 BC for 1 legion, which he believes was understaffed based on Appian (ibid).[50] Crawford refers to the 10 million denarii that Decimus Brutus paid from his own money (because the treasury was out of money after Caesar's assassination) for a total of seven legions which amounts to 1,428,754 denarii per legion in 44-43 BC (697). Based on the coins found in the hoards dating to the time of Gaius Gracchus, Crawford explains the large increase of a million denarii in the cost of legion from the third to first centuries BC (ibid). He attributes it to Gaius Gracchus' reforms when he was tribune of the plebs and "an inflated corps of generals aids" (ibid)[51]. Regardless of the reason, Crawford estimates that the annual cost of a legion more than doubled when it went from 600,000 denarii after the Second Punic War to 1,500,000 denarii starting in 123 BC--a substantial cost increase.[52]

[50] Crawford confirms this is based on "evidence of the doubling of pay under Caesar" (697).
[51] Although it may be unusual for a tribune of the plebs to be involved with the military, Crawford "conjecture(s) that it formed part of his legislation" (ibid).
[52] In a footnote, Crawford mentions that Gaius did a similar reform to prevent provincial governors from extorting money from their people.

Crawford finishes his discussion on Rome's annual expenditures versus the amount of money it minted based on the hoard fines in a graph that starts at 157 BC and ends at 133 BC. During this time, Rome was in a few different wars along with the Third Punic War, including the Fourth Macedonian War, as well as some revolts in Illyria and Sicily. The graphs show that throughout this time, Rome had a fairly consistent annual expenditure of about 2.5 million to 3 million denarii (Crawford, 1974, 698). At the same time, the graph suggests that Rome minted enough money to meet expenses.[53] From what Crawford's data suggests, the purpose of making coins was for the government's expenditures and most of it was to pay the army. For example, Crawford notes that from 150-145 BC, "the volume of troops rises for the recruitment of troops against Carthage" (699).[54] Thus, Crawford's research on coin hoards also shows the enormous cost on Rome to pay for its military in the tens of millions of denarii even in the Republic.

Given the uncertainties of Speidel, Alston and Duncan-Jones' estimates of individual soldiers' pay for certain times, I am more comfortable answering the question of what Roman soldiers were paid in total when using the material evidence. I start with P. Panop. Beatty 2, with, as Alston translates it, three requests "to the city of Panopolis to pay the salaries of the troops… [with] "73,500 denarii be paid to an *ala*, 65,500 denarii to a cohort and 343,300 denarii to a number of legionaries" (119). Although we do not know how many soldiers were in each unit or rank, the number of denarii allocated for payment is more than 480,000 denarii. This is a sizable amount of currency just for one city in Rome's vast empire. Second, Crawford's work based on

[53] Per the chart on 698, from 157 to 148 BC the number of coins produced closely mirrors the total expenditure as measured in millions of denarii according to Crawford. His research shows that from 147-139 BC, annual expenditure is slightly higher than the number of coins made. From 138-136 BC, the number of coins dramatically exceeds the total amount of expenditure, which is similar to what it was in the late 140s BC. In 135 BC, the number of coins made was below the expenditures. In 135 BC, the number of coins is lower and 134. There is almost an exact inverse for excess coins of 135. In 133 BC, the final year, both expenditures and coin production match.
[54] Crawford also addresses the lack of correlation in 147 to 145 BC but explains that when the war ended in 146 not as much money was needed (ibid). He notes that in 141 BC the denarius was devalued probably because there were too many in circulation which will be discussed further in chapter 3 of this paper (ibid).

the material evidence of the coin hoards is persuasive on this point, too. Indeed, Roth concurs in my reliance on Crawford's hoard research and its connection to Roman military expenditure (232). Indeed, both scholars' research covers the period of this thesis. Although Crawford cautions that his theory of a correlation between the number of coins made per year and the amount of the state's expenses could be impacted by whether payments were regularly made in new coins, given the concerns in Duncan-Jones' analysis, I feel that Crawford's evidence is more reliable. Crawford is drawing it from coin hoards rather than the written evidence used by Duncan-Jones which can have bias, be inaccurate or be ambiguous which even Duncan-Jones noted.

Thus, my answer to what it cost to pay the soldiers was "a lot!" Crawford supports this with his graphs that show Rome's costs to pay its military was in the millions of denarii, which increased substantially over time. As repeatedly noted, there is very little documentary evidence on individual soldier pay. As discussed earlier, scholars disagree over whether papyri that do seem to apply to individual soldiers' rate of pay are maybe just the receipt of what was received and are often unclear as to the dates or status of the soldiers. Even P. Panop. Beatty 2, which suggests large lump sums to pay the military does not clarify how many soldiers are in the units or their ranks. P. Panop. Beatty 2 is helpful, however, in giving insight into how much Rome paid the soldiers not individually but as a part of its total budget when it reflects multi-million denarius payments to Panopolis to distribute to its troops. I also have confidence in Crawford's reliance on coin hoards and other material evidence not to show what individual soldiers were paid but to note that many hundreds of denarii were minted because Rome needed them to pay the soldiers when fighting its many wars. Thus, using material evidence and assuming that the army was Rome's biggest expenditure, Crawford estimates provide strong support for the very

large cost of paying Rome's army. In the next chapter I examine the currency used to pay the soldiers to provide further confirmation of Crawford's research that the cost of paying Rome's army was monumental.

7. The Impacts of the "Company Store"

Clearly, with such large expenditures of money involved, ancient Rome was a military industrial complex. But who prospered from it? It certainly was not the foot soldier who paid between 50 to 100% of what he earned back to the government to cover his supplies. Obviously, the Roman government benefited by having such a strong military presence that supported and helped create the Empire. But did the Roman government take advantage of this massive group by operating like the "company store" to profit further off the backs of its soldiers? Did the Roman government of the first and second century charge the troops for supplies, even as it found ways to receive them for free or less than market costs—all to Rome's benefit? Having such a monopoly would allow for the government to profit off of the soldiers and could cause them to remain indebted, requiring them to continue their service beyond what they intended to pay off their military debt. According to Speidel, "some soldiers [owed] over 176 denarii to the Roman state" as noted in RMR 73 (356), a sizable sum, especially considering what they were paid. By the time of the Punic Wars, the government provided all of the soldiers' supplies as discussed above. Speidel's scholarship shows that "soldiers' basic necessities were provided for… (with) the costs being deducted at source" (364). This raises questions of whether soldiers were receiving their supplies at market value, making an even exchange, or whether the military was incurring a loss in provisioning the military—or even making a profit.

Based on the government's tendency towards corruption, I propose that the government made money off the supply network and acted as the "company store." By this, I mean that for

many periods of Roman war, the government was the only place where soldiers received their supplies. As Roth concludes in his discussion of how Rome supplied its military, "What is clear, is that whatever the method used, the emperor remained in firm control of the system" (243). Indeed, Roth writes that "private contractors did supply horses and clothing to the army, they probably rarely were directly involved in gathering provisions for the military" (242). Roth also notes that "Money could be used for market purchase for staples, but although soldiers did purchase supplemental items from sutlers, we have no attestation of such purchases on a large scale" (238).

In the beginning, Rome paid the market price for its supplies. Roth cites Polybius that during the second Punic War, the Romans were purchasing grain from Egypt at market prices (225). Similarly, Roth writes that in 191 BC, Roman envoys went to Africa and Numidia to buy grain for the armies in Greece (227). Roth indicates that they "contributed literally millions of modii of grain, a significant amount of the army's needs" (242).

Yet, over time Rome found ways not to pay market price. First, Rome began to take supplies at below market prices. Roth cites Livy, who contends that people in Spain complained about Rome making them sell the government grain at below market value or just giving the government the money instead as a tax (233). Roth also writes that once Rome gained control of Sicily, Rome took its resources at below market cost (226). Second, because Rome was such a large customer, it could pressure supplies on prices. Roth cites Duncan-Jones, who estimates that "in Egypt the price of grain set by the state was one-third lower than the market price, and this can probably be applied to military purchase as well" (238). Third, Rome avoided paying for supplies when it made forced requisitions instead. According to Roth, Rome started relying on mandatory contributions from allies during war time (229). Roth argues that some of this grain

would go to the government, the grain dole and the military, "which was an obvious recipient" (ibid). Fourth, eventually, Rome made the transportation of grain a part of the tax obligation, which amounted to additional government cost savings. Fifth, some of the allies gave Rome supplies for free to get in Rome's good graces. Roth cites Livy, who mentions that sometimes Rome's allies or other states voluntarily gave supplies to the military (225). Roth cites an inscription from Larissa, which notes that the Thessalian League contributed 4,300 baskets of wheat (229). Also, Roth notes that "Nero ordered two of these client kings, Agrippa II of Judaea and Antiochus IV of Commagene to supply military forces for Domitius Corbulo's army in 54 A.D.124" (239). Sixth, Roth mentions that wealthy individuals "provid[ed] large amounts of supplies to the army without cost during the second century" (ibid). He writes that "A local magnate in Ancyra set up an inscription stating he '[supplied] the forces wintering in the city and sent forward [with supplies] those on the way to the war against the Parthians' in 113–4 A.D." (ibid). Roth also refers to the "astonishingly high contribution for an individual to make (compare those made by the entire state in Republican times)" when "Flavius Damianus of Ephesus gave 201,200 medimnoi of grain, the equivalent of over 800,000 modii to Roman army" as it returned from the Parthian War in 166 AD (ibid). As Roth notes, "This is enough to feed an army of 40,000 for over five months" (239-240). Even into the late Republic, Roth notes that Rome started to requisition supplies from the provinces and also from the allies, which continued into the civil wars and the concurrent breakdown of authority (240). Additionally, Roth cites Cassius Dio's complaints when Caracalla forced him to provide supplies when he wrote:

> There were provisions (epitedeia) that we were required to furnish in great quantities . . . without receiving any remuneration and sometimes actually at additional cost to ourselves—all of which supplies [Caracalla] either bestowed upon the soldiers or else peddled out (240).

While Rome was finding ways not to pay market rate for supplies, history suggests that soldiers were paying Rome market rate for their supplies. For example, Warren Treadgold cites the Theodosian Code in *Paying the Army in the Theodosian Period*, which states that soldiers were reimbursed for supplies at market rate at the time the payment was available even if they received the payment later, when the market rate had risen due to "scarcer and more expensive" (303). Although this applies to a time period beyond the scope of this paper, it is persuasive here. The fact that Rome codified this rule of soldiers and market price surely supports the fact that this was: 1. important and 2. Rome's practice when dealing with military supplies. The law makes clear that Rome would not give the soldiers the "float" by waiting and taking their reimbursement later, when the costs of those supplies may be higher based on seasonal changes or crop blights. This makes clear that market price was what was expected from soldiers at the time the supplies were billed. Comparing this with Roth's evidence of Rome's cost savings to avoid paying market price, while soldiers were charged market rates suggests that Rome itself took the "float" between what it really paid for the supplies and the expense that it charged the troops. Perhaps this ended by the mid-to-late Empire. As Speidel suggests, the soldiers were buying rations for themselves (and their horses) either from the army or through other agents, including camp followers (365). And so ended Rome's ability to profit from the soldiers through its company store of a supply chain.

Finally, these arguments are strengthened because of the culture of corruption endemic to ancient Rome. The Roman state had a tradition of fraud and corruption, and its military continued that tradition. There is historical testimony to evidence fraud in military pay. Pliny (Ep., 7,31) found "*magnam foedamque avaritiam, neglegentiam parem*," which called for official

controls of the "*rationnes* alarum et connfortium" (Speidel 364). As expected, in a vast organization like the Roman military, there were many layers of management in its financial services. Speidel states that supply services were run by the troops' specialists, and troops' accountants performed financial administration (364). Because the troops' accounting left so much money under the commander and/or camp's control, the temptation for corruption would be great. Moreover, Alston indicates that centurions had a habit of asking their soldiers for bribes (117). Perhaps the most corrupt unit in the Roman army was the praetorian guard. Examples of their extreme greed include assassinating emperors in order to get a pay increase when the new one took the throne, or even selling the throne to the highest bidder after assassinating his predecessor. To evidence their double dealing, of course they assassinated him, too. Speidel provides more evidence of military fraud when soldiers found ways to cheat the system to get higher pay. According to Speidel, the *cornicularii* unit was not a dedicated cavalry unit, "but received equestrian *stipendia* 'simply as a means of increasing their pay'" (369, n. 96). Because Rome was a top-down culture, evidence of greed at the lower levels suggests the common practice at the top and the temptation to charge its vast number of troops for supplies that were received by donation or under market prices would be likely.

8. Chapter Conclusion

In conclusion, I support the concern that there is insufficient evidence to calculate with certainty ancient military pay beyond the pay of legions in the first two centuries. Given that archaeology's efforts to date have failed to produce intact military pay ledgers usable with the greatest confidence, perhaps the field needs to look beyond traditional documentary evidence. In the introduction, I talked about how the skeleton of the soldier at Herculaneum piqued my interest in the issues of Roman military pay and using numismatics as evidence of it, which is the

basis of this thesis. According to the museum's exhibit, he was found with a bag of fused coins containing 12 denarii and 2 aurei which is a total of 62 denarii, with a 25 to 1 aurei conversion. The exhibit description says this amount is the equivalent to a praetorian guard's monthly pay (Jarus, 2021). Yet, the amount in his pouch does not equal Speidel's pay rates for the praetorian guard's basic pay of 1,000 sestertii or 250 denarii per *stipendium* (363) This 250 divided into three months equal 83 and a third denarii, not 62 per month.[55] Perhaps, similar future findings may better help answer many questions germane to my research.

With this foundation on what individual soldiers may have been paid in ancient Rome and more importantly the evidence that such collective payments were a substantial amount, in the next chapter, I will explore how those payments were made. In so doing I will further rely on numismatic evidence and provide examples of coins from the period in the McMaster Museum of Art's Bruce Brace Coin Collection that were of the types that were used in ancient Rome. I include these as a Roman archaeologist who enjoys material evidence and to give readers a clearer picture of the material evidence from the period.

CHAPTER 2: CURRENCIES USED TO PAY SOLDIERS.

In this chapter, I will explore how Rome paid its troops through the currency it used. I attempt to determine the source of the money and the currency denomination used for soldiers' pay during the Republic and the Augustan and Flavian periods of the early Empire. Many scholars argue that soldiers were paid with denarii. Yet, as Fleur Kemmers states in *Coins for a Legion,* "a problematic aspect of military payments…is whether they were made in gold, silver or bronze, or in a combination of two of them" (193). In this paper, I will also explore that

[55] It is also odd that the museum writes of monthly pay, when Roman soldiers were paid in three *stipdendia* per year.

question using the known literary and documentary evidence that scholars have used. But the evidence is scarce. As I raised earlier, despite the importance of the army and Rome's habit of record keeping, there is not much surviving material evidence on the administration of military pay. To help fill that void, I will uniquely use the numismatic material record of hoards found at a legionary border fort on the lower part of the Rhine in the Netherlands and a camp followers' site in an effort to supplement the scholarship on how Rome paid its soldiers. This numismatic research supports the conclusion that the government and the military used silver denarii for commerce, including for paying the troops. In a similar effort to expand our field's use of numismatic evidence, I will reference examples of the Dutch coins found and tie them to similar ones found in the McMaster Museum's Bruce Brace Collection to create a visual of the numismatic record in the Appendix. This research advances the field of the classics in the inquiry to explore how soldiers were paid and where the money came from.

1. Introduction to Roman Coin Use

During the timeline of my inquiry, the most common Roman coins in circulation included the as, denarius and dupondius. Towards the end of the period of this research, the denarius aureus (or just aureus for short, later known as the solidus) came into more common use in the Roman economy. This was made of gold and was the most valuable. The gold quinarius was the second most valuable, but it was never very widely used; Rome stopped making them relatively quickly towards the beginning of the Empire. The denarius was silver and the most widely used during this timeline. The next highest in value was the silver quinarius, which was worth half of the value of a denarius. It was used during the Republic and Augustus' reign, but it fell out of use after that. During the Republic, the sestertius was made of silver but was not widely used. Later, starting in the early Empire, it was made of bronze and became more commonly used and was

worth a quarter of a denarius. The dupondius was bronze and by the time of the early Empire, it was worth an eighth of a denarius. The as was one of the smallest value coins and originally worth a tenth of denarius during the mid-Republic. The denarius was invented to be worth 10 asses, but the as was devalued after the Punic Wars and became worth a sixteenth of a denarius by the time of Augustus. The semis was half of an as. The quadrans, the lowest valued coin of this group, was a quarter of an as. As discussed in chapter 3, all three of the lower value coins became valueless during Rome's later periods of inflation, and so people stopped using them.

2. Where the Money Came From

With this background of the types of coins used in Rome, this section will briefly examine where Rome obtained the money to pay for Rome's vast military operations. This raises two questions: (1) where did the resources come from to make the coins and (2) where were they made? Knowing this information will help to explain how the money made it to the front in order to pay the troops.

Kenneth Harl's *Coinage in the Roman Economy* examines how so many coins were produced in ancient Rome to support the government's obligations, including its substantial expenses in paying its military. Specifically, Harl traces the source of the raw metals to create the coins. According to Harl, mining and spoils captured in war were the biggest sources of gold and silver for Rome, which were then turned around to pay the troops (78, 80). This largely dwarfed money obtained from trade. Rome did, however, receive large amounts of silver from trade on the Silk Road and imports from Georgia and Armenia (Harl, 1996, 79-80).[56] Much of the mining was done in Spain, Yugoslavia and Romania, including Dalmatia, which today is Croatia and

56 Harl said the aureus was for international trade and the denarius for national use (86).

Bosnia's coast. Mining was easier to do after the civil wars, when the emperors suppressed piracy during the Pax Romana. The government also deployed military escorts to protect the metal shipments to the mints (Harl, 1996, 80).

To answer the question of where the raw materials were converted into coins, one must examine the various Roman mints. According to Harl, mints were designed to tend to the government's needs, over trade. Mints tended to make more coins for paying the army, as well as government purchases and imperial gifts, rather than everyday commerce (Harl, 1996, 86). Originally, when Rome started making coins, it produced them in Rome. In *Roman Imperial Coinage*, C.H.V. Sutherland et al. use both the historical and archaeological record to catalogue coins produced during different Roman emperors. This gives a general overview of the coins produced at the mints during this time. According to Sutherland et al., during the Julio-Claudian period, the Roman mint remained the largest. Augustus expanded outside of Rome and eventually large mints were built in Merida, Spain (Emerita) and Lyon, France (Lugdunum) which was probably the second largest mint after Rome.[57] At this time, Rome also built smaller mints in Spain, including in Cordoba (Corduba), Zaragoza (Caesaraugusta) and Nimes (Nemausus) in Southern France (Sutherland, 1984, 26-7). Those tended to make smaller value, bronze coins (Sutherland, 1984, 27).[58]

During this time, the largest deployment of Roman troops was on the front at the Rhine. Lyon, France was closer to the front than Rome—making it easier, faster and safer to transport the large sums of pay needed for the troops. This is supported by Sutherland, who cites Strabo,

57 See also Harl, 1996, 79.

58Nimes coins depict perhaps one of the more interesting pictures on ancient coins. Nimes coins depicted a crocodile chained to a palm tree, in honor of some veterans of the conquest of Egypt who were settled there. This remains on its city crest today.

that all of the gold and silver coins from the reigns of Augustus and Tiberius came from the mints at Lyon (28). Harl states that during this time, these mints manufactured the most money "for reasons of security" (86). In 64 AD, Nero moved production back to Rome to centralize control over the money supply where they minted gold and silver (ibid). He left open smaller mints in the eastern half of the empire and other areas to produce local currencies. This pattern suggests that Augustus cared more about the Rhine frontier and paid attention to the army's needs, including getting paid. In contrast, Nero was more concerned with the core parts of the empire and wanted to exact more control over the money supply. Below, I will use material evidence in numismatics to provide support for this timeline that allowed Rome to pay its soldiers during Rome's wartime expansion and address the type of currency used to make those payments.

3. How the Romans Used Coins

Although the aureus was the most valuable, according to Harl, the silver denarius was the most important coin in the new Augustan coinage system (73). Originally, in the eastern half of the Empire, the denarius served as a replacement for the drachma (Harl, 1996, 87). It became the most widely used coin in the Roman system. Harl gives four reasons to support why the silver denarius evolved to become the most popular Roman coin. First, it was because of the growth of the economy during the Pax Romana. Second, the Imperial government was spending more money than the Republic had, and so it had to start taxing in coin more often than it did before and it only accepted silver coins like the denarius. Harl notes that the Bible confirms the use of denarii to pay taxes (ibid). Third, the reforms made it easier for the people to buy and sell things than it had been during the civil wars. Fourth, and most critically, people trusted the Augustan system because it was not as debased as during the civil wars (Harl, 1996,74). Harl argues that

the Roman government, rather than the people, used the aureus and the denarius and their biggest expenditure involved paying the army (86-7).

According to Harl, wherever the army went during the Empire, the denarius went with it (87). During the Republic, the conquering Romans were content to let the locals keep using their own currency. This aligned with Rome's general strategy to allow local self-government, including using local coins. Over time, however, Romanization became the official state policy. By the time of the Empire, the Roman army tended to bring its own coins with it. Harl suggests that when the Roman army used the denarius to pay the military, it helped to spread it all over the Empire (ibid). Harl's conclusion helps to support my theories that resulted from examination of the Nijmegen evidence, below, which shows that the Roman army was paid in denarii and that bronzes were the coins used in daily commerce.

4. The Literary Evidence

My next line of inquiry was whether Rome paid its soldiers in denarii? There is some support in the literary evidence that Rome paid its military in denarii. In *Annals, Book 1,* when writing about the mutinous legionaries in the year 14 in the provinces of Pannonia and Germania, Tacitus indicates that they wanted a pay raise to a denarius a day. Yet, Speidel uses sestertii in his scholarship because he argues that it was the "basis on which the soldier's pay was originally calculated" (ibid, cf. Jahn 1984, 65). Johan van Heesch supports this when he writes, that "Salaries of ordinary legionary soldiers are fairly well known and the figures, expressed in sestertii, the unit of account and abbreviated HS (the Roman symbol for sestertius, originally IIS or two and a half asses)" (80). Alston also supports this when he cites Casius Dio in Book 67 of his *History* for evidence of an additional raise of 400 sestertii instead of their previous 300, annually for legionary pay. (114) Alston notes that Suetonius also supported these numbers for

the raise (ibid). I argue, however, that based on Rome's inherent conservatism, most Roman authors usually reckoned different amounts of money in sestertii. This is true, even as the archaeological evidence suggests the sestertius became less common as time went on. Even when reckoned in a foreign currency, the even conversion to denarii reflected that Rome paid its troops in denarii. Alston cites Polybius' passage in his *History of Rome*, book six, where he was writing of the Second Punic War (113). There, Polybius writes that the cavalry received a drachma per day (vi. 39. 12f). As a Greek, he writes the amount in Greek coins. Similarly, Alston also note that Dio referenced a letter by Macrinus, who complained about the high cost of the raise that the soldiers were demanding in 218 AD under Emperor Caracalla when discussing the raise in drachma (74. 36). Although admittedly scarce, the use of a denarii reference in the literary evidence provides some support for the theory that it was the denomination used to pay at least the legionary soldiers.[59] As Speidel notes, however, more support is found in the archaeological record, below.

5. The Archaeological Record

a. Documentary Evidence: Papyri

The known papyri serve as additional support for the theory that Rome paid its soldiers primarily in denarii. Even if soldier's *stipendia* was reckoned in sestertii, Speidel writes that it was paid mainly in denarii per material and documentary evidence (350, n. 4). The documents Speidel relied on to create his pay formulas used denarii. Speidel translates what he calls the "missing link," or the pay receipt of the Vindonissa writing tablet, as Clua, received "50 denarii" and his next pay would be "75 denarii." (354). Speidel also notes that RMR 70, ChLA 446 and

[59] As noted earlier in Chapter 1, this is another example of a trend I have noticed with Roman writers using different units of reckoning when talking about different kinds of expenditures.

495 reflects payment in denarii (and obols). RMR 70 is a ledger-like document with lists of payments and deductions along with balances. According to Alston, "most soldiers had 175 denarii on deposit of which 75 denarii were the *viaticum*" or their travel allowance (118). Rome also used denarii to pay these so-called "stoppages" to the soldiers. RMR 68 shows stoppages in denarii (Speidel, 1992, 363). Similarly, stoppages and reimbursements for supplies were paid in denarii. RMR 76 reflects a *stipendium* of 25 denarii for the cost of yearly horse hay money for the horsemen of the *Ala Veterana Gallica* (Speidel, 1992, 356). Although the purpose of the amount paid is under debate, in P. Yadin 722, it either references a payment of 50 denarii (as Speidel notes [361], the most likely explanation) or that 50 denarii is the sum of the deduction taken by the military (361). Either way, whether a credit or a debit, P. Yadin 722 also reflects the military's use of a denarius-dominated pay system. All of this material evidence provides further support that the Roman army primarily used the denarius.

b. Material Evidence: Coins

To further support the use of the denarii I turned to the numismatic material evidence from archaeological finds for guidance as to the currency Rome used to pay its military. I started with Harl's research where he reviews the archaeological records of excavations and hoard evidence throughout the Roman Empire from 300 BC to 700 AD. Harl's intent was to determine how the Romans used their money. Although I am focusing on the specifics of how the Romans paid for their military operations, Harl's larger research is useful. Harl notes the "implausibly" low number of bronze coins found in the Bath springs, which were thrown in tribute to the gods (84). He argues that this low number reflected the Roman people's use of bronze coins for their everyday transactions. Harl suggests that the Roman people did not save the lower value bronze coins because they were widely used in circulation. Harl also claims that caused people to save

any gold and silver coins that they obtained, because they did not use them in their daily economy.[60] Similarly, emperors did not reuse bronze and brass coins, because they stayed in use for so long.[61] He argues, in contrast, the government reused silver coins regularly as part of its commerce and bill paying. Thus, Harl notes that the Roman government had a tendency to make more silver and gold coins, and that they were used to pay the military and for other government needs in the economy (84). In contrast, he explains that bronze coins were used for people's daily commerce.

While Harl's scholarship provides further support for the theory that Rome used silver denarii to pay its military, I believe that Kemmers' excavation report in *Coins for a Legion* provides stronger evidence of the state's use of silver in paying the troops. Her research focuses on the Roman coins from a University of Nijmegen (formerly the Catholic University of Nijmegen) excavation from 1987 to 1997. This research documents coins found at both a legionary fort and a camp followers' site in Nijmegen in the Netherlands. The first site was the legionary fortress from the Augustan period, where the soldiers were stationed and the second site was the *canabae legionis* of the 10th Legion, Gemina, where the camp followers lived (Kemmers, 2006, 11). Nijmegen was in the ancient Roman province of Germania Inferior, or lower Germania, which garrisoned legions in two sequential forts. The Rhine frontier, part of the border for Germania Inferior, was one of the biggest deployments of the Roman army. Because so many soldiers were stationed in this area of the Rhine, it is likely that the coins found in forts from that area were used to pay the army and would help to illustrate the type of money used to

[60] Bronze coins were saved only after the runway inflation of the Third Century AD. Unfortunately, they became useless anyway. Conversely, Harl argues that people would save gold or even silver coins because they were not used much. (84).
[61] I suggest that perhaps the government did reuse the gold and silver for coins because they were used to pay taxes.

pay Roman troops throughout at least the Western half of the Empire. This site is also illustrative because it shows the coins found in the surrounding camp followers' site which may give insight into the coins used in its economy, further supporting Harl's theories.

Traditionally, scholars have relied on German forts along the Rhine for material evidence on the issue of use of the denarii. I argue that the Dutch fort in Kemmers' research has many features of those German forts and should be relied on, too. First, because of its proximity, the Dutch fort has many features similar to border forts on the main part of the Rhine. Although German forts are generally situated directly on the Rhine River, the two forts in Kemmers' research were located the Waal River, which is a distributary of the Rhine. Second, towns often grew up around Roman forts, especially the ones on the German part of the Rhine which later became big cities. Examples include York, Mainz, Trier, Newcastle, Manchester, Lancaster and Doncaster. Mainz is one of the main German forts that scholars rely on for information on legions deployed on the Rhine frontier. In Nijmegen, the town of Noviomagus grew around the fort, too. Third, Kemmers argues that the Dutch forts are similar to forts found along the main part of the Rhine based on data found at Nijmegen which follow the trend of similar border forts along the Rhine (101). For example, the Nijmegen excavations uncovered many Flavian aurei, which are especially common to forts along the Rhine. Fourth, based on excavation data for some other forts on the Rhine, during Augustus' reign, forts were built further from the river. Some modeling of bricks made by Roman legions stationed in Mainz show that the find spots for earlier bricks were further away from the river than the find spots for later bricks.[62] This suggests that Flavian-era forts were located further away from the river than Julio Claudian forts. Scholars

62 (Dolata et al., 2009)

suggest that the earlier locations allowed barbarians to easily attack the forts by crossing the rivers in order to pillage Roman border towns. The Nijmegen fort, a Julio-Claudian fort, was similarly located on the Rhine. Finally, the Nijmegen excavation is significant in recreating the coins used to pay the Roman army, because it includes samples of coins from throughout the peak of Rome's military expansion, from the Republic to the Third Century. For all of these reasons, I argue that the excavation of Nijmegen provides strong numismatic support for how Rome paid its troops.

Kemmers' work, a continuation of her 2005 PhD dissertation based on the field notes from the University of Nijmegen's field work, is useful to answer the question of how the Roman military was paid. In her research on typochronology classification and iconography, Kemmers used the coins to try to reconstruct why the Romans chose to build a fort in that part of the Netherlands during the Augustan period. I believe that the evidence found from the excavation gives further support for my research on the kinds of coins used to pay the military forces that inhabited the sites. I will use Kemmers' research to discuss in chronological order the found coins and the types of coins found in each. As a classical archeologist, I will also tie in some examples of found coins and some that I found in the McMaster Museum's Bruce Brace Coin Collection that are the same as those found at the Nijmegen sites in an effort to help readers visualize what soldiers' pay would look like in the Appendix.

i. Republican Era

During the Republican and Augustan eras, Rome paid its soldiers with silver coins, which Kemmers' field notes support.[63] A large cache of Republican coins was excavated at the former

63 Kemmers also notes that some Celtic and two Greeks coins were found at the site but that is beyond the scope of this paper.

Canisius College in the area of the Hunerberg, a hill in Nijmegen. Two hundred and twelve silver coins were found, consisting of 172 denarii and 40 quinarii, ranging from 211 to 27 BC (Kemmers, 2006, Table 3.1, 72). At another site, the excavation found substantially fewer Republican silver coins—only 11. Seven were denarii and four were quinarii (Kemmers, 2006, Table 2.4, 33). Although Kemmers believes that the coins were Republican, because Augustus kept producing them after he became emperor, she acknowledges that those coins could be Imperial. She also notes that all of the coins were minted in Rome. As indicated above, Rome originally produced coins in its mint in Rome. Harl notes that Augustus expanded the production in Rome by opening new mints there. Augustus also created new mints outside of Rome, including in Lugdunum or Lyon (Harl, 1996, 75). According to Harl, the mints in Rome and Lugdunum manufactured the most money (ibid). In 64 AD, Nero moved production back to Rome to centralize control over the money supply.

Kemmers' records show that proportionately more bronze coins were excavated—a total of 90, and all were asses (Table 2.5). At least six are from Rome, two are from Spain and one is from Sicily. Because Kemmers' research comingles the legionary fort site data with the camp followers' site, it is impossible to tell specific finds from each. Yet, this numismatic evidence from the Republican era supports Harl's theory that bronze coins were common and were frequently used in Roman commerce such as camp followers' sites and with so many found silver denarii, it supports the theory that Roman soldiers were paid in denarii during this period.

ii. Augustus/Early Empire

Kemmers says that Augustus minted a substantial number of bronze coins (214). This is supported by the numismatic evidence that shows a total of 166 Augustan bronze coins at the site (77). She also notes a slightly larger number of found silver coins including some silver quinarii, worth half of a denarius, from the early Empire (72) and 172 silver denarii (75).[64] Again, because Kemmers' coins come from both the camp followers' site and the fort, this supports Harl's theory that bronze coins were used in daily commerce and that the silver coins could have been used to pay the troops.

Kemmers notes that three of the denarii were minted in Rome. Eleven of the denarii were from France, Lugdunum. Eight of the ten Lugdunum coins had Gaius Caesar and Lucius Caesar, Augustus' grandsons on the obverse (75).[65] Kemmers points out that this series of denarii made in Lugdunum was common to other forts along the Rhine that were built during the Augustan era. This provides further support for my argument that the Nijmegen site was a Rhine fort and

64 As a classical archaeologist, I wanted to incorporate some of the artifacts from my universities' museum into my thesis to help the reader have a visual of the types of coins found in Nijmegen. In an effort to determine if similar coins in the McMaster collection could be the types of coins found in Nijmegen, I read Kemmers' description of the coins and cross-referenced them to Crawford's *Roman Republican Coinage*, which is a catalogue of excavated coins from the Roman Republic or to *Roman Imperial Coinage*. Those that were matches are included in the Appendix. For example, a substantial majority of the denarii from Nijmegen which dated from the early Empire had pictures of Augustus on the obverse. Cross-referencing *Roman Imperial Coinage*, catalogue number 77A in the Augustus chapter, shows that they were minted in Spain. Those coins are similar to a silver denarius from the McMaster Museum, accession number 20030030001C. I include the museum's photo of it in the Appendix as Exhibit A. Exhibit A has Augustus on the obverse dated 19 BC and like the one from Nijmegen, it has an oak wreath on the reverse and was minted in Spain. On the back, it reads "because he saved the citizens."

65 We have a similar example of this coin dated to 4 AD in the McMaster Museum, accession number 20040010034C, Exhibit B in the Appendix. The silver denarius has Augustus on the obverse and his grandsons on the reverse.

for using her evidence to support my research on military pay in denarii. This also reflects Augustus' efforts to move the mints to where the troops were located.[66]

iii. Tiberius

By the time of Tiberius' reign there was a shortage of bronze in the Northwestern part of the Empire, so Augustus' successors did not mint many bronze coins (214). Kemmers notes that the government would have had more incentive to react to a silver shortage because soldiers would not get paid, and they would mutiny (ibid). But a shortage of bronze was not a problem for the economy since it was still mainly a barter system. Because of this different economy and the greater need to pay the army, Tiberius would have sent more silver coins to that area to pay the army (ibid).[67] This is supported by Kemmers' notes that show that the coins found at the site date to Tiberius' reign are mostly denarii and asses. Of the total 61 coins from that era a large number, 15, were denarii, 23 were asses, one a dupondius and one a quadrans (Kemmers, 2006, 88).[68] The numismatic evidence from this era of Tiberius' reign supports Harl's argument that the local commerce used bronze and the government used silver, especially to pay the troops.

66 Kemmers described 40 of the silver denarii found at the sites as "ship coins" with Mark Antony's name on them. In my cross-referencing to Crawford's *Roman Republican Coinage*, Crawford's catalogue number 544, is a "ship coin" that is the one that Kemmers' sites from the Nijmegen dig site. The McMaster Coin Collection, accession number 20050040002C, Exhibit C in the Appendix is an example of a similar ship coin as that found in Nijmegen. The museum catalogue's dates Exhibit C from 32 to 31 BC. The coin has Mark Antony's initials and some titles, including *Triumvir*, which is abbreviated as III VIR. The McMaster catalogue notes that "in order to meet the heavy expenses of his large military establishment, Antony coined large quantities of somewhat debased denarii in the year or so before the decisive battle of Actium (31 BC) against his rival Octavian."

67 I believe that over time, the economy of the Northwestern Empire started to rely more on bronze coins because of the increasing number of Roman citizens settling in newly founded Roman colonies as part of the Romanization policy.

68 In *Roman Imperial Coinage,* the authors claim that the gold and silver coins issued at this time were poorly made. Specifically, they site to the letters that were hard to read (92). The bronze coins, however, were made at a different mint and were better produced. Rome's mint started making bronze coins during the Republic and during the reign of Tiberius and they were good quality (92). Two examples of denarii from Tiberius' reign in the McMaster Museum reflect the shoddy work of the period. The first is accession number 19910050003C, Exhibit G in the Appendix. It is dated 37 AD and is a silver denarius of poor quality. The museum notes indicate that Tiberius only

iv. Caligula

Although Kemmers includes Caligula in the Julio-Claudian tradition who used silver coins, the coins found at the excavation sites during his reign were all bronze. Per Kemmers, there were 33 asses and 16 dupondii with three sestertii (89).[69] Kemmers writes that silver and gold coins from this period were rare (88). The absence of any silver coins from the sites during this time may be explained by the fact that although both bronze and silver were produced during this time, more copper coins survived. Silver and gold coins were often made into jewelry and other items, including melting them down to make new coins. I argue that this would be especially true with an unpopular emperor like Caligula, where people would be excited to melt down his coins to get rid of his image. Extrapolating from Harl's thesis, perhaps this shows that more dupondii were used in daily commerce.

v. Claudius

Mostly bronze coins were found at the excavations from Claudius' reign, with just a few denarii. Kemmers' notes more than 120 coins from the period, including 24 asses and 16 dupondii, eight sestertii, three quadrantes, and four denarii (91). The excavation produced only

made a few types of gold and silver coins and repeated the same pictures from previous issues. The museum's catalogue also notes that the most common type of silver coin depicts a seated female figure. It also claims that the silver coins were of a better quality at the beginning of his reign and over time were more poorly made. The second type of coin made during Tiberius' reign that is also in the McMaster Museum Coin Collection is accession number 20020050002C and Exhibit D. This coin copies a Republican era design that shows the goddess Victory driving a quadriga, or four-horse chariot. Yet, the McMaster catalogue identifies Tiberius driving the quadriga. Building on the Republican precedent, I would suspect this is Victory, but it is hard to tell. This coin is dated 15 AD and is the earlier of the two Tiberius coins.

69 McMaster's Coin Collection has an example of the type of bronze coin found at the site from Caligula's reign. It cross-references to *Roman Imperial Coinage* number 38 in the Caligula chapter. McMaster's coin, accession number 19870030004C, Exhibit E in the Appendix, dates to 38 AD. It depicts the goddess Vesta on the reverse who is identified by name.

four silver denarii.[70] Kemmers claims that this is typical of early Imperial sites (90). Again, this supports Harl's theory on the large-scale production of bronze coins and their use for commerce. Perhpahs, even the soldiers at the fort would exchange the denarii from their pay for bronze coins to use with the camp followers or the town, as discussed in more detail, below.

vi. Nero

Coins from Nero's reign were excavated at the two sites, including the precious metal coins of a silver denarius and two gold aurei (Kemmers, 2006, 92). Kemmers notes that it was rare to find an aureus at a site. She indicates that it was especially rare to find two from the same emperor, as was found in Nijmegen, but that a lot of gold coins were found in the Dutch river area, such as Nijmegen (93). Kemmers writes that Nero's aurei were the most common in the entire northwestern Empire and are particularly common in the province of Lower Germany, where the sites were located (93, n. 373). Kemmers references other scholarship that suggests such a proliferation was connected to political dealings with the Batavians (93, n. 374). I interpret that with two possible scenarios. First, Rome used gold coins to pay Batavian soldiers serving in the Roman army there—a coin that they would accept. Second, for the same reason, the gold was used to pay off other Batavians not allied with Rome to deter them from pillaging Roman border towns.

Similar to the Republic and Augustan periods, Kemmers' field notes show that the largest share of excavated coins from Nero's reign were bronze, consisting of 60 dupondii, 5 sestertii, 87

70 Kemmers notes that most of the four denarii had "PP" on them that means "father of the country" (90). She notes that even if a coin is well worn from use, the picture of Claudius can be recognized because of his long neck (n. 358). The McMaster Museum has an example of such a bronze as from the reign of Claudius, accession number 19880010003C, Exhibit F in the Appendix. Kemmers' "Claudius of the long neck" is depicted on the obverse but the McMaster's Museum catalogue's additional notes appear to confuse Claudius with Germanicus.

asses and 11 semisses.[71] This small number of semisses at the site reflects that by Nero's reign, the use of semisses was starting to decline. Kemmers reminds that Augustus' efforts at efficiency included moving the money supplies towards the front lines such as Lugdunum, in today's southeastern France, which was much closer geographically to the forts than the central mint in Rome. Later, Nero moved all the mints back to Rome in an effort to recentralize the money supply, but those reforms took time to implement. Kemmers' numismatic evidence supports this because the majority of the Nero-era coins were minted in Lugdunum (116) and only two were made in Rome (Table 3.14, 93) Per Kemmers, the remaining 52 coins could have been from either mint. Of the eleven semisses, two were clearly from Lugdunum, and the mint for the remainder is unclear. This is made more complicated because both mints made the same types of bronze coins. This supports my theory of the importance of Kemmers' research as evidence of how Rome paid its military because Rome thought that if they moved one of the mints to where the front line was it would be easier to transport money to troops stationed on the Rhine frontier, including avoiding banditry.

A bronze coin from the McMaster collection, accession number 19890010004C, Exhibit I in the Appendix also helps illustrate Nero's consolidation of the mints and the delay in implementation. This coin matches the description in *Roman Imperial Coinage*, but the Nijmegen version was made in Lugdunum, probably a pre-reform coin, (Kemmers, 2006, Table 314, 93) while the McMaster's coin, probably a post-reform coin, was minted in Rome. According to Kemmers, the majority of the Nijmegen site-discovered coins were made in Lugdunum (116). At the sites, Kemmers notes that the number of pre- and post-reform coins was

71 Kemmers was uncertain whether nine of the coins were dupondii or asses (ibid).

equal—six of each. This would also help to explain the difference between the site coin and the McMaster coin. As Kemmers notes, Nero's reforms, including the consolidation of the mints in Rome, took time to implement. Overall, the abundance of bronze coins found at the combined sites suggests their use in the camp followers' commerce in the *canabae*. Also, the presence of an unusually large find of precious metal coins in the area supports the government's use of them. Here, that would include paying the troops at the fort and possibly the Batavian raiders.

vii. The Year of the Four Emperors

The Nijmegen excavation uncovered coins from the year of the Four Emperors (68-69 AD). The majority of those coins were from the reign of Emperor Galba and included 7 sestertii, 7 asses, 3 dupondii, and 4 denarii (Kemmers, 2006, 100). Galba's reign was the longest of all of the emperors due to his strong power base. He was the only emperor to make coins out of all metals and made them in large quantities. To help build his public image, Galba copied some of the coins from Augustus' reign to suggest that he would bring back the peace and stability of Augustus' reign after the turmoil of Nero. It may not be surprising that because he made the most coins and reigned the longest out of all the Four Emperors, the McMaster Coin Collection has a coin from Galba's reign that is similar to one found at the site. Parts of the design on accession number 19870020016C, Exhibit H of the Appendix, copies some of Augustus' earlier denarii with "*Ob Civis Servatos"* enclosed within an oak wreath. This provides evidence of Galba's use of propaganda.

The coins from this era support the completion of Nero's reforms of centralization in Rome. Most of the coins made during this reign were made in Rome; only one was minted in Lugdunum, two were also minted in France, and five were unknown. One coin was found from the reign of Vindex and four from Otho; all of them were minted in Rome. Similarly, five of the

eight Vitellius-era coins were mostly minted in Rome, too. Even though most of the coins were bronze, finding four denarii shows the impact of the military in the location.

viii. Vespasian

According to Kemmers, the site contained 61 denarii from the area. Such a large amount of silver provides evidence of the government's use of silver to pay the large legion stationed there.[72] A single gold coins was also found. Although it is unusual to find Roman aurei at any archaeological site, she notes that this is not unusual to find gold in Roman forts along the Rhine for this period (322, 101). She writes that in prior Nijmegen excavations larger numbers of aurei were found. Although the Romans had aurei from the time of Julius Caesar, they seemed to rely on them more by the time of the Flavian dynasty. By the time of the Flavian emperors, Rome was in a weak financial situation following Nero's reign and the wars that followed. The solution was to mint more money and to raise and implement new taxes along with austerity (Harl, 1996, 92). Evidence of gold at the site suggests a general trend that Vespasian started to use more gold coins to pay the troops than previous emperors had. Based on Nero's debasement of silver coins during this reign, by the time Vespasian came to the throne, the Roman government started to use more gold coins to pay the troops than they had previously. Harl, agrees this was because aurei were not debased, and silver coins were. Harl even notes that this is why people eventually started calling aurei "solidi" (solid bits) as a slang term, because they were hardly ever debased. By the reign of Constantine I, he officially changed the name from aureus to solidus, since that was already the popular name (Harl, 1996, 149).

[72] Many of the silver coins from the Flavian dynasty found at the site were debased.

The changing demographics of the Northwestern economy caused a need for more bronze coins in the area. Vespasian increased bronze production to help jumpstart the nation's economy. The majority of Vespasian era coins found at the Nijmegen sites were bronze. There were 357 asses, total, 172 dupondii, 21 sestertii and two quadrantes. Also, sixty-five coins were probably too worn to tell if they were asses or dupondii (Kemmers, 2006, 101). Kemmers notes that during the Vespasian and Domitian eras, larger quantities of bronze coins were sent to the Rhine frontier area (216). She supports this by using evidence that none were found in Trier and Cologne, the two of the biggest cities on the Rhine frontier. They were found in places with big military presences—some of which were far removed from big cities, like Mainz, Nijmegen, Neuss, Mirebeau, and Vindonissa (Kemmers, 2006, 216). She argues that because the area was poorer than the bigger cities, frontier prices were lower than the core of the Empire so, more small coins like quadrantes were needed (216-218).

Here, again, the issue of minting, centralized or near the front lines, is illustrated. Starting with Nero, the Empire started to make most of the important coins in Rome; the less important bronze coins could still be minted in the less important mints that had not been shut down. During the reign of Vespasian, the majority of the asses (205) were from Lugdunum, 27 were from Rome and 125 could have been from either of those two. The majority of the ones that Kemmers calls uncertain, whether they were dupondii or asses (58), could have been from either Rome or Lugdunum. Six that were easily verifiable were from Lugdunum, and one was from the City of Rome. The majority of dupondii were from Lugdunum (119), and 11 were from Rome. Forty-two could have been from either of the two. Ten of the sestertii were from Lugdunum, eight were from either of the two, and three from Rome (101). The majority of the denarii (57) were from Rome, two were from Lugdunum and two were from either of the two. Because coins

from the two sites were commingled, this find supports Harl's theory that the most common coins in use were bronze, but that the silver could have come from the legionary site as military pay.

ix. Titus

Kemmers notes that in the reign of Titus, 17% of the found coins were denarii (104). Curiously, one of the denarii found was debased and designed like an aureus with similar pictures (Kemmers, 2006, 104). The remaining 83% of the coins were bronze. The types of bronze coins from the reign of Titus were mostly asses and sestertii, with a few quadrantes and dupondii (Kemmers, 2006, 105). The author is surprised that the number of sestertii was higher than the number of dupondii. The large percentage of denarii found at the site reinforces the government's use of them to pay the large legion stationed there. The high number of bronze coins also reinforces their commercial use in the community.

x. Domitian

Domitian made many reforms to remedy the ills of Rome's economy. Vespasian and Titus used the mint in Lugdunum for sending payments to the front, but Domitian moved it back to Rome again to recentralize everything. Domitian continued earlier efforts to revitalize the Roman economy after Nero's disastrous impacts. He restored the fineness of the silver coinage and weight of the gold to how it was before the debasement in prior decades (Kemmers, 2006, 218). I agree with Kemmers that Domitian did end up facing many financial problems as time went on because of heavy expenditures on military campaigns and construction projects. But it seemed like he was a capable administrator, despite all the accusations from his enemies (Kemmers, 2006, 199).

Kemmers notes that 18 denarii were found at the sites from the reign of Domitian, 81 to 96 AD (106). Kemmers reports a large number of bronze coins from Domitian's reign, including 304 quadrantes, 317 asses, 124 dupondii and 46 sestertii—all of the latter from 90-91 AD—and 16 of undetermined value from the year 84 AD onwards (107). Kemmers indicates that this was especially true during Domitian's reign because of his centralizing tendencies. Domitian wanted a more top-down organization of the provincial and imperial administration (Kemmers, 2006, 218). As part of that, he probably banned the use of local coins and copies of other Roman coins as he, too, attempted to return to the good times of Augustus' reign. As a result, Domitian made more quadrantes, including a special type quadrans only found along the Rhine area. It may have been designed for use only in the area. Quadrantes found in Britan and other areas were all of a different type than this (ibid).[73] Kemmers assumes that the Imperial government was aware of how useful the quadrans was in that region and would feel more of a need to create such a specialized coin for that area only. This caused them to be exclusively found in military use. Kemmers argues that these coins were made especially for the 10th Legion, which was stationed at Nijmegen (216-219). She writes that Domitian's entourage might have transported these special coins when they were heading to Mainz to set up his headquarters so he could take personal command of the army stationed along the Rhine in his war against the Chatti (218). She notes that Domitian wanted to play a bigger role in the administration of the provinces. For example, when Domitian set up his headquarters in Mainz to conduct a campaign across the Rhine, his centralizing tendency would have encouraged him to use bronze coins there based on its strategic importance and connection to the entirety of the Empire. Yet as discussed in Chapter 3, below, Domitian had to debase the denarii because of the costs of the war with the Chatti. This

[73] Quadrantes found in Britain and other areas were all of a different type than this.

large number of Domitian-era denarii at the site supports the government's use of it to pay the troops stationed there. This large number of bronze coins also indicates a high level of commercial activity occurring in the Nijmegen area during this time that the legion continued to dominate the area.

xi. Nerva

Kemmers states that due to Nerva's short 16-month reign, he did not produce many coins (109). Her notes support this with only 42 coins found from Nerva's reign. Two were silver denarii. The remainder were bronze consisting of 20 asses, 13 dupondii, 6 sestertii and one that is unclear if it is a dupondius or as. Even with this small sample size, the bronze coins dominate, which supports the theory of government use of silver at the military site and commercial use of bronze.

xii. Trajan

Further supporting Harl's theory that bronzes were used on a daily basis, the majority of the 179 coins found at the excavations from Trajan's rule were bronze. This included 89 asses, 60 dupondii, 20 sestertii, two semisses and one quadrans with seven unknown as either dupondii or asses (Kemmers, 2006, 110). Kemmers reports five denarii were found with a date range of 103 to 111 AD (110). Only one quinarius was found at the site, which I noted was the last one mentioned in the field notes. Quinarii had started to fall out of use after the Augustan period, so by the Trajan-era, it would make sense that not many survived. Again, the numismatic evidence from this period supports consumers' use of bronze and the state's use of silver for the military.

xiii. Hadrian, the Antonines, and the Crisis of the Third Century

The Tenth Legion abandoned the fort at Nijmegen by 104 or 105 AD during Trajan's reign. It would make sense that not many coins were found from that time on. The field notes

reflect this, so I combined the remaining three periods at issue in my research. Kemmers reports 13 coins found from Hadrian's reign, (111), four from the Antonine dynasty (Table 336, 112), and nine coins from the Crisis of the Third Century (112). The Hadrian coins were: two silver denarii; three sestertii; three dupondii; three asses and two that could be either a dupondius or an as. The four Antonine era coins consisted of one as, two sestertii and one that is either a dupondius or an as. The Crisis-era coins included two asses and three Antoniniani. One of the Crisis coins was from the Gallic Empire. During this time, the Netherlands were part of the Gallic Empire that declared independence from Rome at the beginning of the Crisis.[74] This gives additional support for using Kemmers' scholarship because the Nijmegen fort was part of the heartland of the breakaway Gallic empire, which was in existence during the timeframe of my research.[75] Although the sample is small for these three periods, it is useful to support my argument. First, because the legionary fort was abandoned, only two silver denarii were found. Finding this small number of silver coins during three periods supports the absence of soldiers from the area as the legion moved on. These silver coins were probably used by the government in its operations as they departed from the site or were left behind from a soldier's pay. Second, because there were a larger proportion of bronze coins found, that supports the conclusion that the found bronze coins were used by the people in commerce which continued until they relocated from their site.

74 Postumus was a general who was originally a Batavian, so it is possible that he could have been from the area around the forts which are across the river. He started as a Batavian auxiliary but then became a general. Later, while stationed in Cologne, another major Rhine fort, his troops proclaimed him emperor and he declared independence from Rome. After, he founded a new breakaway state that became known as the Gallic Empire. Eventually the Netherlands became part of that breakaway state, along with other provinces including Britannia.

75 Although the McMaster Museum has three coins from this period, Sutherland does not address them in volume 2 and so they are not addressed here. The second volume of *Roman Imperial Coinage* only covers the principate or early Empire and does not cover the Crisis of the Third Century as a result, so I do not know if the coins in McMaster's collection match the ones found at the site or not.

7. Were Only Precious Metal Coins Used to Pay the Military?

Although the coin evidence from Nijmegen provides strong support that the denarius was the currency Rome used to pay its troops, finding so many bronzes and even some gold coins still does not provide an answer to my line of inquiry as to whether troops were paid only in silver. Kemmers raises the question if Rome used all of the metals when paying the troops (193). Yet, the comparison of the large number of silver coins found at the miliary fort site to lesser numbers found at non-miliary excavations, provides further support that the denarius was the standard coin of the Roman military. According to Antony Kropff in his article "The Bronze Enigma; Soldier's Pay and Civilian's Taxes in the Northwestern Roman Empire AD 69 to 197" that looked at the role of money changers in the northwestern part of the Empire, "In the northwestern provinces of the Roman Empire, first-and second-century sites usually yield a coin ensemble with a 90-95% share of bronze coins" (1). In contrast, Nijmegen showed an especially large number of silver coins around the military site, especially for certain periods of time, as discussed above. Similarly, Crawford's hoard research from sites within Italy from 157 to 31 BC shows at least four hoards where denarii made up a significant amount of the coins found (642-671). Crawford's research on hoard sites in France, dated to the 140s or 130s BC, also shows hoards with majority silver. This makes sense because in the decade before the first triumvirate, when soldiers started to shift towards the borders of the Republic, the hoards in central and southern Italy stopped containing denarii, while the hoards in northern Italy and southern France still contained denarii (Crawford, 1974, 657). This provides additional support for my hypothesis that the troops were largely paid in silver, because the sites in France would be closer to the front line fighting at the time. I think the biggest flaw in Kemmers' research is that she combines the total coins found at both sites in her reporting. As a result, I believe that the reason so many

bronze coins were found is that they came from the camp followers' site, where they were used as part of daily commerce—which was a large focus of Kemmers' research (11). Additional research segregating the coins to location might provide further support for the denarius as the primary coin used to pay the soldiers.

Some scholars argue that bronze coins were not used to pay the soldiers because it would have been too heavy and too costly to ship them. Kropff supports this when he cites Duncan-Jones that paying a year's worth of wages to pay a single legion in bronze coins would weigh 300 metric tons (7-9). Kropff reminds that stoppages would have eliminated much of that weight as payments to soldiers were mostly paper transactions, as discussed earlier (9) He cites to R. Wolters' research that after payment of stoppages, paying one legion in asses, assuming a 66% deduction, would weigh 30 metric tons (ibid). Kropff also reminds that Rome's army had great logistical support and could have shipped the coins if it desired (ibid). Kemmers claims the coins would have been shipped by water. She cites the archaeological evidence from a shipwreck where a ship carrying coins sank on its way from the mint to a legion site on the Rhine (194).

As discussed earlier, Harl's research advocates that most commerce for the average citizen was conducted in bronze. If bronze was indeed used as soldier's pay, Kemmers cites the scholarship claiming that the Roman government successfully shipped large quantities of bronze coins to the sites by contracting out the transportation to the local money changers.[76] Kemmers argues that this theory is supported by the fact that money changers in the Eastern half of the Empire changed local currencies to Roman coins, including bronze. But in the Western half, she

[76] The quantity of coins the government needed to make payroll; it is probable that those amounts are substantially lower than one might estimate because much of the soldier's pay was deducted for his expenses. Thus, much of Rome's payroll was largely a paper transaction with little actual currency paid out as discussed earlier in Chapter 1.

writes that money changers worked especially for the convenience of the soldiers who had to change their precious metal coins into smaller denominations (ibid). Kemmers questions why there would be less risk for moneylenders than the government. I would counter that by saying that the government calculated that risk and decided to let others take it. Kemmers argues, without evidence, that either the army contracted with the money changers to transport the bronze coins, or the troops or states might have transported the money to procurators of the province who would have sold it to the money changers in turn (196). Yet, Kropff argues that transportation of money from Rome to Nijmegen would have cost about three to five percent of the value of the coins, which would discourage anyone from transporting them (7) He argues that if money changers in the area had to buy the coins at face value at the mint in Rome, "most likely without a discount, [this] would have given rise to fraud" (ibid). Kropff argues that this additional cost would not have been passed on as it would be "unacceptable to soldiers and civilians and probably to the Roman authorities" (ibid).

Kemmers also wonders why the government would mint coins only for middlemen in order to get them into common use. One example I suggest supporting her theory of the Roman government contracting with the *publicani* was in pre-Augustan times (especially the Republic) when it contracted out the duty to collect taxes to the highest bidder. Then, the government gave them a quota of how much to collect, even as they extorted or skimmed some for their own profits. Yet, Kemmers' argument is weakened by Kropff who said that money changers did not operate in the northwestern part of the Empire, which would include the Netherlands (1). If so, the soldiers would not have used money changes to convert their pay of denarii to bronze in Nijmegen, as she suggests.

Although I still think that the military was primarily paid in silver denarii, I think that they did receive some bronze in their pay. Kropff agrees and he writes, "we can be quite sure of the bronze component in soldier's pay between AD 69 and 197 in the northwestern provinces…[but] after AD 197 the *stipendia* lost their bronze component (8 and 10).[77] He says that soldiers "needed bronze coins for local small payments" (ibid). Kropff writes, 'Transactions and exchange between soldiers and for instance pubkeepers and shopkeepers would have been seriously hampered if the soldiers did not have bronze coins at their disposal" (9)[78]. Supporting his argument that there were no moneychangers in the West, Kropff concludes that "the army had to supply the soldiers with bronze coins as part of their *stipendia*" (ibid).

Providing additional support and of more interest is Kropff's discussion of Domitian's shipment of quadrantes to the legionary fort in Nijmegen (5). Of the 414 quadrantes found at the site, 304 were issued under Domitian and were probably produced between 81 and 82 AD (ibid). He notes that such "consignments of coins with specific reverse types, relevant to the recipients" were sent to specific army camps. I think that this helps to support that the military was paid in at least some bronze because at the time of the shipment, those who lived outside of the fort in the surrounding areas were probably still using the barter system. Because their typical design does not suggest a commemorative coin, the only reason that the emperor would have those coins sent to the area was to pay the army. Kropff supports this because he reminds that Domitian came to the Rhine frontier to take personal command of the legion stationed there when fighting with the barbarians across the river in 83 AD (6). I conclude that perhaps Rome's use of bronze in

[77] Kropff cites Kemmers as his support for this.
[78] He also argues that Crawford was wrong that the state only minted coins, but Kropff argues they were then used for daily commerce (9).

soldiers' pay was just to make up the difference in their pay generally, or perhaps as Kropff suggests, in the West to give soldiers small change to use in the local economies.

Some of the scholarship argues that gold was also used, in part, to pay the troops. I think this is true, especially after the silver denarii became so debased as discussed below in chapter 3. Kemmers notes that some say that gold "would have been too difficult to use in daily practice" and supports that by noting that gold is rarely found at archaeological sites (193). Kemmers notes that "because it is rarely found in settlements, the circulation of gold is relatively hidden from view" (ibid, n. 623). She supports the theory that soldiers could have been paid in gold by a comparison to non-military Roman archaeological sites, which generally do not have many aurei as compared to many military Roman archaeological sites, where large numbers of gold coins were found (ibid).[79] For example, she notes the hoard evidence in Kalkriese, the possible site of the battle of the Teutoburg Forest, showed a large number of gold coins, a total of seven (ibid). Like many other excavated Rhine forts, Nijmegen had an unusually large number of aurei as noted earlier. Thus, there is some support that the soldiers were sometimes paid in gold. Under this theory, returning to the Herculaneum exhibit, the fact that the soldier was found with two gold coins would suggest only that he was a soldier, but as discussed earlier, would not, alone, provide evidence of his rank. Because his armor helps to identify his status as a praetorian guard, finding gold provides at least anecdotal evidence that soldiers were paid in both gold and silver.

Yet, evidence arising after Kemmers' research weakens her argument. A 2017 excavation in another part of Kalkriese found separate hoard evidence of 200 denarii (University of Osnabrück, 2017). Because the number of denarii at this later site is so high, it suggests that silver was probably the coin used to pay the soldiers stationed there, or at a minimum, that silver

made up a substantially greater part of soldiers' pay than aurei.[80] Even including the additional excavation in Kalkriese from about 2015 to 2016, where a total of eight aurei were found, those numbers of gold coins are too small to suggest that they were regularly used to pay the large number of troops stationed there. These hoards later found at Kalkriese provide additional support for my hypothesis that the troops were largely paid in silver with possible occasional use of gold.

I conclude that Rome predominately paid its military in silver denarii. I agree that all three types of metal were occasionally used. I think that payment by bronze occurred when a soldier's pay did not evenly break into denarii. The literature includes examples of uneven numbers including one-half or one-quarter of currency which would have required smaller, bronze coins for payment. Also, some of the literature gives evidence that Roman soldiers were paid with other currencies. As mentioned earlier, Tacitus wrote that the legionaries mutinying in Pannonia wanted to be paid a full denarius per day like the urban cohorts, instead of the 10 asses per day they were receiving. Although larger numbers of bronze coins were found at the two Nijmegen sites, Harl's research indicates that bronze was used as the commerce of the community for non-military sites. As Harl wrote, "Mints were really designed to tend to the government's needs over trade. Mints tended to make more coins for paying the army and government purchases and imperial gifts rather than everyday commerce" (86). I also believe that gold was used for troop pay as time went on. Although the scholarship supports payment in gold when it cites a military pay raise of three extra aurei per year, that does convert evenly to 75 denarii, so, it is possible that silver was used. Moreover, it would have been unusual for the government to use aurei, when they mostly reckoned everything in denarii. However, as

[80] Translation provided by Google Translate.

discussed in more detail in Chapter 3, when the denarii became debased at times, the government started to use more gold coins which were not debased and had more value, which the soldiers would demand. All of this suggests that soldiers were paid in all forms of metals. Sometimes it might have been convenient to make up the difference when their pay did not fit neatly into a denarius. If soldiers were ever paid in bronze, however, they were no longer receiving them by the Fourth Century AD. As Harl says, all of the lower value coins had become valueless during Rome's later periods of inflation, and future emperors abandoned their production (77). As a result, soldiers would have been mostly paid in silver, with occasional bronze early in this period and occasional gold coins which became more widely used towards the end of the period.

7. Chapter Conclusion

Despite Roman authors reckoning military pay amounts in sestertii, the material evidence shows that payment was made in denarii. Literary evidence often comes with its own bias. I also argue that the documentary evidence is determinative on the issue because the soldier would see it along with his pay and he would make certain that the two would match. Also, this is further supported because the sestertius and other bronze coins disappeared by runaway inflation, as discussed in chapter 3, below. My use of the Nijmegen numismatic material evidence further supports the conclusion that Rome paid its soldiers largely with denarii. Analysis of coins from a numismatic perspective allows a reconstruction of their use including circulation periods as was the case in Nijmegen. Kemmers' field notes show large quantities of found denarii at this military site compared to other non-military excavations. Because so many soldiers were stationed in this area of the Rhine, it is likely that the coins found at the Nijmegen site were used to pay them. This helps illustrate the type of money used to pay Roman troops throughout at least the Western half of the Empire. Kemmers' research is insightful for both the geography and the

time frame of this thesis, too. Rome deployed some of its largest numbers of soldiers in the Rhine area, so it is likely that the money found at Nijmegen was meant for the purpose of paying the troops. Including the numismatic material evidence from this Dutch fort also supports earlier research using artifacts from German Rhine forts as evidence of a legionary presence. Thus, this suggests that the denarii found at the site of a legionary fort was the currency used to pay its troops. This ties into the evidence from Roman mints that the government produced large quantities of silver coins for its own use, including paying the military. Also, the Dutch coin finds provide support of coins use throughout the timeframe of the military's occupation of the fort and the surrounding site for camp followers. This research is especially helpful because the closing of the fort creates natural "control" groups that allows for an analysis of the evidence under military use and non-military use. Thus, it created natural research variables that show that when the military was in the fort, large numbers of silver coins were found but when the fort was closed, that stopped. Kropff also mentions that the archaeological evidence from Nijmegen and Vindonissa suggests that in the northwestern provinces of the Empire, when the legions moved on, the supply of new coins in the area was cut off (8). As a result, the Nijmegen numismatic evidence is a new and important addition to research on Roman military pay, which makes more robust the previous sparse evidence known to date.

I want to acknowledge that Kemmers' philosophy encouraged my use of numismatic material evidence to research how Rome paid its soldiers supports Kemmers advocates for an expanded use of coin finds to be part of the historical record—which she argues historians tend to ignore (15). Moreover, including the Nijmegen sites serves a larger purpose of spotlighting a lesser-known period of history, including the Batavians, the use of the antoninianus and even the Gallic Empire, in addition to providing strong evidence of the types of coins used to pay Roman

soldiers. I would encourage more research in this area by segregating the coins to the legion site and camp followers' site to further strengthen my conclusion that the government primarily used silver to pay the military and bronze was used for local commerce. In the next chapter, I will explore the impact on Rome's economy caused by making these substantial payments of precious metals in coins to its army.

CHAPTER 3: HOW PAYING ROME'S ARMY CAUSED INFLATION

In this last chapter, I will explore the economic impact of funding Rome's largest line-item payment, its ever-expanding army. This chapter explores whether paying the army caused inflation or other stressors in the Roman economy during the period of the mid Republic to the end of the Third Century AD. Economists acknowledge that it is always a challenge to write about an event that occurred many years before the present.[81] Writing about economic conditions in the early days of Rome is further complicated, as mentioned in earlier chapters, by the lack of or quality of the documentary evidence or records on the Roman economy—causing it to remain a somewhat speculative field. Yet, there is much scholarship to support my conclusion that paying Rome's large armies contributed to its economic inflation in at least three ways. For the purpose of this paper, inflation means a negative impact on consumer buying power caused by an increase in prices.[82] During many time periods covered in this paper, inflation occurred when the cost of goods increased, which allowed consumers to buy less with the same amount of money. This would be especially true in the richer provinces where more people were buying goods on a non-barter basis. Tying Rome's payments to its military to inflation does not fully answer the

[81] I would like to thank Dr. George S. Cole Jr., professor emeritus, Shippensburg University of Pennsylvania, for his support in reviewing this chapter and whose comments helped to strengthen the economics arguments included.
[82] It is appropriate that this paper focuses on inflation, as the word originates from Latin, meaning *inflare* or to inflate.

question. The scholarship supports that debasement of its currency to pay its troops was the catalyst to that inflation. This was further complicated by the impact of debasement on unbalancing the bi-metallic standard of Rome's currency which then had to readjust. Thus, like modern economies, Rome's economy was not linear, and the causes of inflation were many. Finally, I will end by exploring the impact of inflation on Rome's soldiers, especially the infantry.

1. The Roman Economy: A Primer

Initially, internally Rome's economy was largely a barter system, with certain provinces relying more on the barter system than money (Duncan-Jones, 1994, 20; Wassink, 1991, 470). Rome began to rely on money more after its increased encounters with states with more monetized economies such as the Parthian Empire (ibid). Alfred Wassink in his article, "Inflation and Financial Policy Under the Roman Empire to the Price Edict of 301 AD," states that this transition, allowing individuals to have money, did not result in inflation because labor and land were available to the economy after the civil wars. Wassink writes that the civil wars during Julius Caesar's reign in 47 BC caused a "scarcity of money" (470).[83] Wassink notes:

> In the beginning of Augustus' reign Rome was still troubled by this constant demand for more money, which had taken the form of a deflationary depression. Faced with this the Emperor proceeded by taking the appropriate step to counteract it: the spending of huge sums of money. This was done directly by means of donations (congiaria), by executing many public works and by providing free public entertainment. It was done indirectly by the distribution of purchased grain and the donation of purchased land to former soldiers (472).

Eventually, towards the end of Augustus' reign and his successors, the Roman economy experienced deflation. The empire ran out of money when after 10 BC, it had quit minting as

[83] According to Wassink, "Gold coins were not unknown in the Roman Republic…from 80 B. C. onwards gold coins were only minted at intervals. It was Julius Caesar who, from 47 B. C., when a great scarcity of money existed, tried to mint large quantities of new coins. Forced by a lack of silver he minted gold coins - aurei - on a large scale" (470).

many coins (Wassink, 1991, 471). This caused the government to raise taxes, which spurred civil unrest as prices fell and interest rates rose (ibid). Wassink notes that at this time, "the government had to spend more money to meet the army's pay" (473). It could not cut this expenditure, or the army would mutiny (ibid). Deflation continued into the beginning of Augustus' reign shortly after the end of the civil wars and he tried to remedy that by infusing money into the economy through infrastructure public works projects, grain donations and public games. Augustus' economic tools were successful, and he continued them for about 20 years, which was made possible by all the spoils he brought back from Egypt which included precious metals used to create the new money. This spurred Rome into a monetary economy from a barter economy. According to A. H. M. Jones in "Inflation Under the Roman Empire," it was obvious that the denarius was the standard coin (1953, 294). Accounts were kept in denarii or sestertii, even though sestertii were no longer silver (but were bronze) from Augustus onward (ibid).

Externally, the empire's economy was largely closed, too. According to Jones, that meant that while Romans traded basic items within the empire, luxury goods were the main reason for trade outside of the empire, and it was unusual (1953, 293).[84] As a result of its closed economy, Rome's coins did not circulate much outside of its territories. Rome sent some gold and silver coins out to "barbarian" tribes, often to pay extortion, but this was on a limited scale and did not largely impact its supplies of coins (Jones, 1953, 293). But Jones believes that it remained static with production balanced by waste and export (1953, 294).

The Roman fiscal system was very rigid, too (Jones, 1953, 296). The main source of revenue was the *tributum* on property in the provinces. Farmers would often pay this in-kind.[85]

[84] Another example of an ancient closed economy was China which has many similarities with Rome.
[85] Wassink notes that when Rome transitioned to a money economy, trading became easier and individual prosperity increased. More people were working in new jobs which provided a stimulus to farmers and craftsman. This allowed

According to Jones, Rome supplemented its land tax by customs duties, and in the early days of the Empire, Augustus implanted a five percent duty or inheritance tax on Roman citizens to help pay for the civil wars (ibid). These taxes were collected at fixed rates, so they would generate a known amount to the government each year. The benefit was that the government knew its budget, but the burden was that there were no surpluses. At times, the Roman government was confiscating so many spoils from its enemies or non-citizens that it could suspend taxation (Duncan-Jones, 1994, 15). Yet, when taxes got too overbearing and the economy was in shambles because of high inflation by Diocletian's rule in 301 AD, he issued his Price Edict or Edict of Maximum Prices to attempt to control inflation via price controls. The problem with standardizing prices was that it ignored different geographical costs of living. Thus, the economic problems continued. In the transition from the Republic to the Empire, Rome began to create coins from different types of metal or a bi-metallic currency (Jones, 1953, 294). This means that Rome based its currency on both a silver and gold standard.

2. Periods of Inflation During Ancient Rome

Given the spartan Roman economic records on the overall state of the economy discovered so far, scholars have used ledgers of sales to try to determine the periods of inflation and deflation in ancient Rome. For example, some scholars looked at the cost of wheat to try to determine when inflation occurred. In his book *The Economy of the Roman Empire*, Richard Duncan-Jones writes,

> Second century prices for wheat in Egypt show an increase of roughly one half over first-century figures. Bread tariffs at Ephesus in Asia Minor suggest a price-rise between the early second century and the early third century of about two-fold. If by this date prices

people to pay their taxes in money rather than in-kind. This caused taxpayers to sell their wares in general or to the army so that they could pay their taxes. That would not have happened if the government had continued to collect taxes in-kind (472).

> had roughly doubled since the early second century, most of the rise after the early second century suggested by Diocletian's Edict would lie within the third century. An increase of 25/50-fold in roughly eighty years would mean an average compound inflation of 4.0/4.9% per year. But the actual rate of increase cannot have been constant; and the speed of price movements is bound to have varied from one region to another (1982, 10).

Most scholars reject an analysis based on wheat prices. Jones argues that the price of wheat is never stable because it is subject to dramatic price fluctuations based on many factors such as weather, transportation issues and costs and crop disease and pest infestations (1953, 295). As he noted, "the Roman Empire apparently produced barely enough for its needs and carried no reserves so that a bad season would send prices rocketing until the next harvest brought them down to normal" (ibid). In his later work *Money and Government in the Roman Empire*, Duncan-Jones also criticizes the use of wheat which he notes is subject to dramatic seasonal fluctuations in price and is not a good commodity to measure inflation with (1994, 30).

Instead, Duncan-Jones suggest a better way to assess Rome's inflation by analyzing the price of donkeys in Egypt from the late First Century to the early Third Century. Donkeys were widely used. Most of the ancient Mediterranean world, including Egyptian peasants, depended heavily on donkeys since the bronze age. Moreover, unlike wheat, donkey prices were not subject to seasonal fluctuations. Donkeys were consistently regarded as cheap throughout the ancient Mediterranean world.[86] Duncan-Jones' research paints a timeline of inflation in ancient Rome. Originally inflation was low at about 1% in the early Empire, at the time of Julius Caesar and Augustus (Duncan-Jones, 1994, 29). There were smaller peaks of inflation under Trajan in about 100 AD when donkeys cost a little over 300 drachmas. After Trajan, Antoninus Pius was

[86] In Speech number 24 by Lysias, called "On the Refusal of a Pension to the Invalid," Lysias writes the defense speech for someone accused of disabilities pension fraud in Athens in ancient Greece. In it, the prosecution said that the accused was rich enough to own a horse when most disabled people used a donkey to get around because donkeys were cheap, so the prosecution alleged he was underreporting his income (Rose, 2017, 140).

responsible for a peak of inflation in about 140 AD when donkeys cost 350 drachmas. Donkeys were at their lowest price during Hadrian and Marcus Aurelius' reign (Duncan-Jones, 1994, 30, figure 2.1). But, during the reign of Septimus Severus, donkeys cost 800 drachmas, the highest on Duncan-Jones' graph, figure 2.1 During this period, the price of donkeys was more than double what they were previously. Based on Duncan-Jones' analysis from the reign of Trajan to the Severan dynasty, the peak of Roman inflation occurred during the reign of Septimius Severus and Caracalla in about 203 AD. To summarize and put this analysis in chronological order:

Reign	Estimated Price of Donkeys in Drachmas	Time Period
Trajan	300 in 98 to 117 AD	Beginning of 2nd C AD
Hadrian	40 in 177-138 AD	
Antoninus Pius	340 in 141 AD at the peak	Middle of 2nd C AD
	and dropped to 60 in 147 AD	
Septimius Severus	800 in 204 AD	Beginning of 3rd C AD
Caracalla	750 in 217 AD	
Macrinus	400 in 217 and ended 500 in 218 AD	

Based on Duncan-Jones' analysis the general trend was that Rome's inflation increased under Commodus and the Year of the Five Emperors, after his death.[87] Thus, Duncan-Jones created a

[87] The author claims that minting and prices do not link up and are not helpful. He analyzes the mint output based on finds in a major hoard but finds no correlation with the price of donkeys. Duncan-Jones does not dismiss this as a connection to his theories on inflation but attributes the problem to the speed of distribution of money. Because it took time for money to travel from the mint to the hinterland the price of donkeys took longer to rise and fall and did not coincide with his proposed peaks of coin production. He calls it a "mismatch" of prices in coin production and prices because it may take years for the new coins to reach areas involved in donkey selling. Also, according to him, Egypt did not rely on money like other areas might have, it mostly retained the barter system which was in use there

picture of Rome's economy during this time, at least for the price of donkeys in Roman-controlled Egypt. The weakness with Duncan-Jones' analysis is just that—it is based on one item. Although the ancient Romans did not understand how economics worked, modern economists track inflation based on trends in prices from many consumer-used items, not just a change in one item like wheat or donkeys.[88]

Wassink's inflation analysis research on ancient Rome attempted to remedy this single item weakness by creating a "general price" index. He started by referencing Duncan-Jones' survey of prices in the Roman world and compared it with his own analysis (465). As reflected on Wassink's table, the "general price level decreased from Augustus' reign until 64 AD and then increased very slowly until 250 AD. Between 250 and 293 the growth was higher" (466). Then, for 43 years, from 250 to 293 AD inflation ticked up to an average of 3.65%. When Diocletian ruled, inflation skyrocketed with the price index going from 1,400 sestertii to 7,000 by 300 AD (ibid). Wassink notes, "overall this evidence suggests that prices in the mid-third century were about three times the level of first century prices, but that mid-Diocletianic prices were 50 to 70 times more than those of the first century" (465). According to Wassink's research based on the rise of prices, inflation was occurring at a very high rate, today known as hyperinflation, in most parts of the Empire during the Crisis of the Third Century and stayed there. Prices rose by nearly 1,000% from the lowest point to 230 years later, at their highest point (ibid). Thus, both scholars propose similar periods of inflation in ancient Rome, at least for the

since the bronze age and concludes that it is difficult to determine the general trend of price changes across the empire because of many factors including barter (32).

[88] This is like today's consumer price index.

periods of their research that overlaps. Using these periods of inflation, I will next look at how Rome's payment of its military might have contributed to it.

3. Paying the Army Contributed to Inflation

It is said that the Roman Emperor Septimius Severus gave this advice to his two heirs: "Enrich the soldiers and despise the rest" (Harl, 1996, 126). Certainly, Septimius Severus lived by his own advice as he increased the troops' pay during his reign at a time when Rome's economy was already experiencing stress. With this attitude, paying the army in ever increasing amounts was a burden on Rome's economy, but did it contribute towards Rome's inflation? In this section, I will seek to establish a link between paying Rome's army which infused the economy with money and contributed to inflation. I use Duncan-Jones and Wassink's research to support this by showing that Rome's largest expense was to pay its military—thus infusing large amounts of money into the economy at specific times that correlate with inflation. To support this theory, I will also explore my second hypothesis that additional costs of: 1. pay raises and 2. increasing the size of the army further helped to trigger inflation.

a. Paying the Military was Rome's Major Expense

Many scholars agree that paying the military was one of Rome's major, if not its largest, expense. According to Treadgold, "Historians, ancient and modern, concur almost unanimously that the army was the principal expense of the empire…" (310). Indeed, in recreating Rome's budget, Duncan-Jones estimates that during the Second Century, "army cost makes up approximately three-quarters of the Empire's budget in the mid second century" which he estimates at between 72% and 77%" (1994, 45, cf., Kropff, 2019, 8). The cost of the military continued as Rome's largest line item in its budget even as Rome's general budget increased

during the third century AD, when according to Duncan-Jones it remained at about "70%, between 64 and 75%" (1994, 46). He concludes that Rome's budget was "largely accounted for by army spending." (ibid). Indeed, when discussing Domitian's pay raise, Duncan-Jones noted that the size of it made Rome's economy unstable (1994, 12). As discussed above in chapter 1, Crawford similarly argued that all Rome's other expenditures were nominal in comparison to the cost of paying the military—to the point that the other costs did not merit inclusion (697) Crawford argued that "the only major annual expenditure" was paying the army.[89] As noted above, Crawford is so confident of this that he only uses annual army costs in his calculations on his tables (697). In support of his argument, Crawford's research shows that Rome mainly minted coins just to pay its military during the Republic. As discussed in chapter 1, Crawford relies on Roman Republic coins as one of his two lines of evidence, which he says were issued for the purpose of allowing Rome to pay its expenditures, predominately the military (698-699). Crawford notes that the costs of such a major expense as the military provides important evidence in his attempt to recreate Rome's economy. Roth, too, supports the idea that paying the military was a major part of its budget. He endorses Crawford's use of coinage as an indicator of military pay. Indeed, in his discussion of the logistics of supplying the army, Roth notes the importance of military spending as an indicator of Rome's expenses when he writes, "It is this fundamental reliance on cash…that makes it possible in some cases, to trace the movement of Roman troops by the activity of various mints" (238).[90] Thus, the scholarship supports that paying the military was one of and probably Rome's largest expense.

[89] Crawford notes this in the context of reviewing Tenney Frank's table of Rome's expenditure. As he writes, "It may at first sight seem misleading to record in the table only the annual cost of the army; but this was in my view the only major annual expenditure. Of the other items listed by T. Frank, none are to be regarded as significant and one should not figure at all, food for allied troops" (697). Crawford does not include the navy in his calculations, and I agree because Rome did not place much importance on its navy.

[90] Roth also cites Kissel, whose research ties Rome's military logistics to its collection of grain supplies (240).

b. Paying the Major Expense of the Military Impacted Inflation

Although I am cautious in applying modern economic principals to an event that occurred many years before the present, Rome's infusion of large amounts of coinage into its economy when it paid the military evidences the modern principle as articulated by the US Federal Reserve that "inflation is caused when the money supply in an economy grows at [a] faster rate than the economy's ability to produce goods and services" (Federal Reserve Bank of St. Louis, 2023). If during periods of inflation in ancient Rome, the production of goods and services was unchanged, then inflation occurred at least in part, because the money supply grew when Rome made its large infusion in paying the military. As discussed earlier when Duncan-Jones estimated ancient Rome's periods of inflation, there was no indication that there was a scarcity of donkeys when prices rose. Under this economic principle, when there is more money available in the economy, items cost more at least in part because consumers have more money to pay for them; prices are higher when there is more money in the economy to use to buy the item. The use of this modern economic principle is similar to Crawford's research that looks at approximate patterns of the economy (e.g., income and expenditure) to try to recreate Rome's missing budget and accountings (633). As noted above, Crawford is so confident of his conclusions from applying his economic analysis, that he only uses annual army costs in his calculations on his tables (697). Similarly, I advocate for the use of modern economic principles regarding inflation.

If paying the military was Rome's largest expenditure, then paying it could negatively impact its economy by contributing to inflation. Many scholars argue that Rome's inflation was closely connected with Roman military expenditures, such as paying the troops. Both Wassink and Duncan-Jones' research suggests that it did. Duncan-Jones so strongly supported a correlation between Rome's paying its military and inflation that he wrote, "The slow inflation

during the second century suggested by the pattern of military pay is supported by figures from Egypt and Asia" (1982, 10). He also wrote that the use of military pay increases is a crude reflection of inflation (ibid). In another reference tying military pay and inflation Duncan-Jones wrote that, "The army pay increases are worth considering in the context of inflation of about 170% between AD 100 and 220. Indexing the rate of pay under Domitian to 100 the likely rate under Severus is 133 and under Caracalla is 200" (1994, 29). Wassink, too, accepts Duncan-Jones' premise that ancient Rome's inflation resulted from payment of the army (465). As discussed earlier, I support both of their scholarship and conclusions.

Under the principle that inflation occurs when large amounts of money are poured into the economy, Rome's payment of its largest budget-line item—the cost of the army—would contribute to inflation. To further support this, I will use Duncan-Jones and Wassink's research on ancient Rome's periods of inflation to tie periods of inflation to military pay. Duncan-Jones and other scholars cite the reigns of Septimius Severus and Caracalla as examples of how inflation grew. At this time, Septimius Severus increased the army size and gave it a substantial raise.[91] Septimius Severus fought several wars as he pushed into Scotland and Africa, and he also fought the Parthians. According to A.H.M. Jones in volume II of *A History of Rome through the Fifth Century*, even with his victories, Septimius Severus had to confiscate a lot of money to pay for this (1968, 296). But was confiscation enough or did all this military aggression contribute towards inflation? Duncan-Jones suggests that Rome was experiencing substantial inflation during the early Third Century AD at the time of Septimus Severus and Caracalla's reigns, when he points out that the price of a donkey rose from 250 to 800 drachmas (or more than a third increase) (1994, 30). Similarly, Wassink shows that inflation was at its third highest during

[91] Cf. Duncan-Jones, 1994, 30; Malchow, 2011, 23

Severus' reign (467). Additionally, Rome had higher levels of inflation during the reigns of Aurelian, who ended the Crisis of the Third Century, and Diocletian, who began his reign by reorganizing the army.[92] During intense civil wars and foreign invasions at the height of the Crisis of the Third Century, between 258 and 275 AD, Wassink's research also reflects inflation when his consumer price index rose from 200 denarii to 267 denarii (ibid). Wassink even labeled the economic activity during Diocletian's reign as "hyperinflation" (466). Thus, the research demonstrates that pay raises to the military correlate to periods of Rome's high inflation. In the next section, I will examine two specific events that may further support the correlation: 1. pay raises and 2. increases in the number of troops.

If paying the soldiers contributed to Rome's inflation, how are periods of deflation reconciled during times of war? Deflation is the reverse of inflation where the prices of goods decrease giving the consumer more purchasing power. Both Julius Caesar and Augustus ruled during periods of deflation even though they were regularly at war.[93] Yet, they had plenty of spoils from their campaigns to use in the economy to prevent inflation when paying their troops. Similarly, Tiberius reigned during a period of deflation or low inflation although he was at war with outside powers and occasional internal revolts. However, he had nationalized the mines of the empire to ensure a steady supply of precious metals to boost new coin production. Similarly,

[92] The scope of this paper only covers the beginning of his reign.

[93] Scholars note a financial crisis in the late Republic when Julius Caesar marched on Rome. This caused a demand for coins which had been withdrawn from the economy by the various factions of the civil wars to pay their armies (471). Julius Caesar used several measures to overcome this financial crisis. First, he minted large quantities of new coins. Because there was a silver shortage, he invented and made large quantities of aurei. He was probably able to make large quantities of gold coins because of the many spoils of war he brought back from Gaul. Second, in an effort to get the average people on his side, Caesar formed a committee to evaluate property owners who could not pay their debts and forced creditors to take property as payment instead of money. Third, Caesar issued a decree forbidding anyone from keeping more than 60,000 sestertii in cash to prevent hoarding. Hoarding by the people had a surprisingly large impact on ancient economies. Caesar probably based this on older sumptuary laws designed to keep people from showing off their wealth which was in part of proper Roman behavior. After the civil war ended, Caesar kept these measures in place and the financial crisis ended but there remained a large demand for coins (471).

inflation was low during Trajan's reign, but this was probably the result of his conquest of Dacia where he secured the Transylvanian gold mines and brought back much gold as he returned with the spoils of war (Jones, 1968, 294). Although there were periods of deflation when Rome was fielding big military campaigns, it seems those emperors kept inflation in check by using the spoils of their wars. If this was the case, there still seems to be a correlation between paying the military and inflation, at least for those who did not have enough spoils or confiscations to pay the troops.

i. Pay Raises Correlate to Inflation

This research demonstrates that Rome's large payment to fund its military correlates with inflation. On a micro scale, the three times a year that Rome made its tri-annual payroll to the army might show that Rome's economy showed such stress. Yet, without the ledgers and accounts of the *aerarium militare* that Roth alluded to (see footnote 1, supra) nothing proves it to that specificity in four-month increments. As a result, I will look for a correlation between specific periods of inflation and military pay raises or increases in the size of the army. I will correlate this data with the research evidencing periods of Rome's inflation by Duncan-Jones and Wassink.

Many Roman emperors raised the soldiers' pay to get in their good graces, but does this additional expenditure cause inflation? Goldsworthy writes that Caracalla's pay raise was, "an indication of the spiraling inflation of the 3rd century AD" (94). There are several instances where soldiers' pay raises tie to periods of Rome's inflation. The first major pay increase, as discussed in chapter 1, was under Domitian when he added a fourth stipendium. Specifically, foot soldiers' pay rose from 225 denarii during the time of Augustus to 300 denarii in the time of Domitian, about a hundred years later. Ducan-Jones writes that Rome's economy was weak at

this time as evidenced by Domitian taking measures to repair it (Duncan-Jones, 1994, 12-13). Duncan-Jones' research illustrated that inflation rose by the end of Domitian's reign as reflected when the price of a donkey in Roman-controlled Egypt started to rise. Also, according to Wassink's analysis during this time when the army received almost a one-third pay raise, inflation rose slightly (467). Thus, there is a concurrent rise in inflation with the raise in soldiers' pay.[94] The second major pay raise to the soldiers occurred under Septimius Severus and it was sizable. Correlating that pay raise with Duncan-Jones' chart, from the time of Domitian to Septimius Severus, shows a large rise in inflation as the price of a donkey rose from about 100 drachmas to 800 drachmas, its highest (1994, 30). Indeed, when Severus granted a raise to the army, it infused money into the economy by allowing them to spend more.[95] Similarly, according to Wassink's analysis, during this time inflation rose more substantially than under Domitian's comparatively smaller pay raise. According to Wassink, the price index rose from about 200 points to 267 points by the end of Domitian reign (467). This suggests the larger the raise, the higher the inflation rate. Third, continuing this trend, according to Jones, Severus' son, Caracalla raised the troops' pay by 50% (1968, 296). Goldsworthy notes that spiraling inflation occurred at the time (94). Wassink's research supports this too (467). According to Duncan-Jones' analysis, in the transition from father to son, inflation continued to rise from 650 drachmas to 750 per donkey at the son's death (1994, 30). These examples, again, suggest a correlation between pay

[94] Wassink suggests that the correlation between the military pay raise and inflation should be ignored here, because Domitian "made other economic irrational decisions" (narrative to table on 467). But, even so, I include it because it is supported by Duncan-Jones' research that inflation occurred, and it fits within my argument that there is a pattern of military pay raises and inflation. While these additional expenditures were designed to spur the economy, as noted earlier, they pale in comparison to the cost of paying the army.

[95] According to Wassink, Septimius Severus also repaired roads, took over the cost of the imperial postal service, and did infrastructure work in the city of Rome and his hometown of Leptis Magna. Finally, he gave money directly to the people distributing grain and medicine and hosting lavish games.

raises to the soldiers and inflation.[96] Additionally, although not as dramatic as the previous examples, when Nerva gave a small pay raise (compared to earlier raises discussed above) inflation rose again. According to Duncan-Jones' chart, from 96 to 98 AD, the cost of a donkey doubled from a little over 100 drachmas to 200 drachmas at the time of his death. Finally, another major pay raise occurred under Diocletian. When he came to power, he set a new pay for the soldiers under his new currency system. Wassink's research shows that during this time the price index rose by 500% (466). Thus, based on the estimates of inflation in ancient times by Duncan-Jones and Wassink, when Rome's soldiers received a raise, it seems to correlate with an increase in inflation.

The research on inflation supports the hypothesis that Roman emperors gave pay raises when Rome's inflation was high. Yet perhaps this creates a "chicken and egg" question. Did they give raises to keep the soldiers ahead of inflation or did giving pay raises contribute to inflation? I argue that the former explanation is unlikely. It is hard to believe that Roman emperors gave the soldiers raises just to keep them happy. First, as discussed above at least for the foot soldiers, Rome's wages often left soldiers with little or no pay. In that case, it seems unlikely that Rome would care about inflation's impact on soldiers when it was already not paying them much more than what it cost to get their supplies. Foot soldiers were the majority of Rome's military and giving them a pay raise would be costly, and not given lightly. Given Rome's displayed lack of benevolence to the troops, that explanation does not work. Even if one could argue that Septimius Severus gave his troops raises to keep them happy as might be suggested by the earlier

[96] As Jones notes, in order for Caracalla to pay the governments expenses, including the military pay raises, it "resorted to confiscations on a large scale" (1968, 296). Caracalla also gave citizenship to anyone in the empire who was not a slave so that he could add them to the tax base, and he doubled the inheritance tax, too. Per Jones, this was increasingly used to pay military bonuses, salaries for bureaucrats, and even payments for certain public works (ibid).

quote, his pay raise was really designed to keep the soldiers on his side and not defect to rival claimants to his throne after he came to power because of a civil war, not because they were complaining that inflation was making them less able to buy things. The latter explanation has more evidence as discussed earlier. Paying the soldiers more because of a pay raise would increase the total line-item payment of the state's budget which is the type of large cash infusion associated with inflationary principles. In this next section I will further examine the correlation between military pay and inflation on another more micro level to see if specific events involving paying the troops like increasing the size of the troops correlated with inflation, thus providing additional support for this theory.

ii. Increasing the Size of the Army Caused a Spike in Inflation

Increasing the size of Rome's army correlates to inflation, too. Duncan-Jones seems to suggest this correlation by looking at the opposite. In the approximately 100 years between the reigns of Augustus to Domitian, Ducan-Jones writes that Rome's economy was weak and that Domitian took measures to repair it by reducing the number of active service soldiers and debasing the coins (Duncan-Jones, 1994, 12-13). Here, saving money by paying less soldiers was a way to combat a weak economy, including the deflation of Augustus's time. In contrast, inflation skyrocketed at the time of Septimius Severus when the size of the army increased substantially as he raised three new legions. As G. R. Watson writes in *The Roman Soldier*, "The number of thirty was finally passed by Septimius Severus, who created three new legions, I, II and III Parthica about AD 197" (1969, 23). By the time of Septimius Severus' reign, inflation took off. Duncan-Jones argues that inflation during his time increased substantially as reflected in his research where the cost for a donkey was the highest during the period he examined. This suggests that Rome tried to control deflation by decreasing the number of soldiers and that

inflation rose when Rome increased the size of its army, such as when Rome exited a civil war and was concerned about external threats, including the Parthian Empire. By the time of Diocletian, this pattern continued with runaway inflation rising to its highest point as he increased the army's size as part of his reforms. This theory is reinforced by the increased number of officers whose salaries would cost exponentially more. Thus, there is a correlation between increasing the size of Rome's army and its inflation.

The correlation between Rome's paying its army and inflation is further supported by a correlation of military pay raises or increases in the size of the army that brought large amounts of currency into the economy and inflation. All of these impacted Rome's economy negatively and contributed to inflation when so much money went into circulation each time the troops were paid. Moreover, tying the scholarship of the inflation timeline to such payments further suggests a relationship between inflation and war. Often in those periods where inflation did not rise, campaigners like Trajan and Julius Caesar returned with many spoils of war, which offset the costs of paying or provisioning the army or sometimes when a war ended, the state's obligation to pay all the troops did too. The next sections will examine how paying the troops impacted other economic factors, like debasement and the bi-metallic standard, which also contributed to inflation in ancient Rome.

4. Debasement was the Catalyst for Rome's Inflation

Rome debased its currency in order for Rome to meet its expenses, including its large payment to the army. According to Duncan-Jones' research on coin hoards in Egypt, coin output does not necessarily match up with inflation (1994, 29-32). I argue that debasement is a better indicator of inflation than the number of coins in circulation. Using the scholarship by Wassink

and others, I will examine how debasement measures contributed to Rome's growing inflation during periods of high military expenditure.

Debasement involves the changing of the metal composition of coins to use the removed precious metal to make additional coins. During the period of this paper, the Romans' main procedure used for debasement was adding copper or another lower value metal to the coin. Over time, debasement became more common in Rome. As noted earlier, although ancient Rome did not have a theory of economics like today, many argue that the Roman government's use of debasement acted like an economic tool that allowed the government to make more coins when needed without depleting its precious metal reserves or when there were no reserves to use. Even though the coins no longer had the same metallic value, the government valued the debased coins at the same value as the original pure coins. Thus, Rome used debasement to put more coins in circulation.

Debasing coins gave Rome enough coins to pay its army. During the mid-Republic, Rome created the denarius, which was meant to be Rome's first silver coin. Roman denarii were originally made with 4.5 grams of silver, which was as pure as the technology allowed at the time. The disadvantage of using so much pure metal content in the coin was that it limited the number of coins that the government could make, which limited its ability to use them for commerce. As a result, over time the Roman government decided to increase the number of coins it could make by decreasing the purity of the coins through the process of debasement. Paying the military was an example of when Rome needed a large number of coins to meet its costs. According to Jones, "When the state occurred additional expenditure, **as for instance during wars**, the government was compelled to sell public property, to confiscate private property (by encouraging informers

to lay capital charges against wealthy persons and securing their convictions) or to **debase the currency**" (1953, 296, emphasis added).[97]

I argue that when Roman leaders debased coins to pay the military, it was a catalyst to Rome's inflation. Using the scholarship, the following is a timeline of efforts to debase Roman coins after the creation of the denarius around 211 BC and its tie to inflation. My research includes Kevin Butcher's scholarship in *Debasement and the Decline of Rome*, where he compares the value of the metal content in denarii (184). Both Harl and Butcher note a link between paying the military and the need to debase coins. For example, although Domitian hoped to reverse debasement at the beginning of his reign, he could not. Harl notes that Domitian started to reverse debasement when he increased the amount of silver content in the denarius at the beginning of his reign. Yet as discussed in chapter 1, Domitian raised the military's pay by one-third in 84 AD and when financial problems occurred by 85 AD, he returned to debasing the silver denarii again. At this time, war began against Germanic tribes and the Dacians which led to the return to the debased rate of 93% silver (Harl, 1996, 92).[98] Thus, according to Harl, these wars ended up thwarting currency reforms and the trend of debasement to pay the troops continued. Later, debasement returned and dipped slightly to 92% silver, where it remained under Nerva. During this time, inflation remained low. Duncan-Jones' chart reflects a low price for donkeys, a little over 100 drachmas and although Nerva started out about the same, donkey prices increased to a little over 200 drachmas. Thus, there was a little inflation under Nerva, but debasement was higher than it was under Augustus due to paying military expenses. This pattern of debasing coins to pay military costs continued. Trajan dropped the silver levels to about 84%

[97] Jones neglects to mention that the government would confiscate from non-citizens, too, but wealthy citizens would have more money and were thus more desirable targets for confiscation.
[98] When Domitian increased the metallic value to 93%, he returned it back to Nero's levels (Butcher, 184).

but it started to climb again to 85% (Jones, 1953, 294)[99]. Again, there was deflation under Trajan but that was due to all the spoils of war from Dacia. According to Duncan-Jones' donkey analysis, the cost of donkeys decreased to the lowest point of about 150 drachmas at this time. Inflation remained low under Hadrian until Antoninus Pius when the price of a donkey went up to a high of 340 drachmas at the time that Antoninus Pius began debasement and he decreased the silver content to 80% (Butcher 184). Under Marcus Aurelius, inflation went down as reflected in the cost of a donkey as he continued to decrease the silver content to about 76% (ibid).

My theory that debasement was the catalyst for inflation is best illustrated from Commodus and onward. By the time of Commodus, the economy began to falter, including the rise of inflation and the denarius was debased to about 68% silver (ibid). During the Year of the Five Emperors, debasement stayed about the same, remaining high. At the end of that, Septimius Severus made a steep decline in the silver content to about half purity, 50% (Butcher, 184; Jones, 1953, 296), and inflation sky rocketed (Wassink, 1991). Per Duncan-Jones during this time, the price of a donkey was the highest and inflation was high, too. According to Jones, Caracalla continued to debase the currency (and he, like his father continued to confiscate) (1968, 296). Wassink's research shows that inflation stayed at Severus' high levels. According to Butcher, in the 210s AD, Caracalla introduced a new coin to replace the heavily debased denarius dubbed the antoninianus by modern scholars (184; see also, Jones, 1953, 296). According to Butcher that plan failed as it precipitated "serious inflation that was only halted by Aurelian's reform" (194).

[99] According to Harl, Trajan's reforms included recycling older coins which would allow more of an opportunity to debase them (92-93). Indeed, in a footnote, Harl notes that one Raja of the Kingdom of Taprobane in Sri Lanka was surprised when he realized that all denarii weighed the same, no matter which picture it included. According to Harl, that was because Trajan recycled so many Republican denarii and they all had different pictures on them (93-4).

After that, Elagabalus continued to drastically reduce the silver content to 44% (Butcher, 184). At the beginning of his reign, Severus Alexander raised the denarius' silver content a little to about 47% but then returned it to Elagabalus' levels (ibid). Wassink's graph of the general price index shows that inflation started an uptick during this time (467). According to Butcher, when Pupienus and Balbinus needed money to fight their war against Maximinus Thrax in the Year of the Six Emperors, which preceded the Crisis of the Third Century, they reintroduced the antoninianus and debased it (195). By the time of the Crisis of the Third Century, a period of civil wars and foreign invasions, the silver content of the denarius reached its lowest value at 0.5% silver by 268 AD (Butcher, 184). According to Butcher, heavy debasement continued to about 43% during the time of Trajan Decius in 250 AD, and according to Wassink, average inflation increased substantially to 3.65%. According to Wassink, by the time of Aurelian in 274 AD the average inflation remained at 3.65% annually (465). Aurelian debased the coins to an almost pure copper standard leaving only about 1% silver. Wassink's average price index rose from 700 to 1,400 denarii under Diocletian's reign and Wassink estimates inflation rose to 22.9% (ibid). The denarius remained debased to its lowest level at more than 99% copper and inflation was high on Wassink's inflation chart and it remained there (ibid). The conventional wisdom was that this inflation resulted from too much debasement and not from a shortage of supplies.

For some of Roman history, it may appear that debasement did not lead to inflation, but a closer examination shows that it did increase costs causing inflation to tick up. For example, according to Butcher, the first major debasement occurred under Nero, where the silver percentage decreased to 93% (184, see also Harl, 1996, 90).[100] Looking at Wassink's research, it

[100] This was after Nero had to rebuild Rome after the great fire, all of his extravagances and the war in Armenia, which was another war with the Parthians (Harl, 1996, 90). In 91 and 92 AD, however, Nero's coins were in continued use because of all the civil wars between the four emperors after his death (Harl, 1996, 91-2).

would appear that inflation was low under Nero, an average of less than one percent, or .7%. Yet, further analysis shows that Nero is not an exception to the rule that the lower the silver content, the higher the inflation. In Nero's case he was working to combat the economy's existing deflation, which was causing unrest, so he wanted to raise rates. According to Wassink's research, Nero was working to end the deflation crisis. He was unsuccessful in balancing the economy, however, and this deflation continued after Nero's death. The amount of silver in the denarii continued to decrease during the Year of the Four Emperors, where the content was about 90%, but again, it did not result in inflation (Harl, 1996, 92). Under Vespasian's rule, the silver content decreased to about 81% and inflation remained low. According to Harl, as a result of Rome's expenses during the civil wars, including funding the war machine, by the time Vespasian came to the throne, Rome's economy was in dire straits but that was not based on inflation (92). The economic problem was based on all the debts of paying for the civil wars plus Nero's extravagance. According to Harl, Vespasian continued to debase the denarius because he told the Senate he needed 10 billion denarii in order to prevent the treasury from failing. Harl notes that that amount was 115 times greater than the largest surplus ever reported in the treasury (ibid). The amount of silver remained at about 81% under Titus, Vespasian's son. Again, per Wassink, inflation stayed low but began to tick up, rising to less than one percent. Later, Vespasian's other son, Domitian, finished paying off the debt that his father had started to pay off and so Domitian raised the amount of silver in the denarius back to the Augustan standard, 98.5% fine silver and the economy stabilized for a while. Thus, a pound of silver would make 96 denarii according to Harl (92). As Domitian fought more wars against Germanic tribes, however, he had to debase the denarii back down a little bit again. Thus, the more Rome spent on its military the more it debased its coins to pay for its spending which caused inflation to tick up.

Even during deflation when efforts were made to jump start the economy, the scholarship supports this theory that paying the troops led to debasement, which caused a negative economic impact on Rome's economy.

Was debasement a catalyst for Rome's inflation? According to Butcher, debasement was simply a way to allow the government to produce more coins (185). Jones argues that Rome needed to debase the denarius because that was the coin used to pay the troops. He supports that by pointing out that the aureus was never debased because it was not used for troop payments (1968, 296). Therefore, debasement is tied to inflation as inflation is tied to paying the Roman military. Based on Wassink's research, there is a stronger correlation between debasement and inflation, especially during the second half of the Crisis of the Third Century, than there is a correlation between paying the army, giving the army a raise or growing the size of the army and inflation as discussed above. Given Roman leaders' repeated use of debasement to attempt to impact high inflation, I agree that it suggests that this was an example of early efforts at economic policy.

Because Roman emperors often debased coins to pay the military, debasement was a more of a contributor to inflation than just the payment of the military. Butcher writes that scholars did not think much about the reasons for debasement and viewed debasement as something that happened rapidly in about 30 to 40 years (186). For example, he notes that Gibbon did not pay much attention to debasement in *The Decline and Fall of the Roman Empire* (187). Yet, later scholars began to link it to the constant wars that Rome was fighting (Butcher, 186). Butcher agrees that the need to debase the denarius was tied to the need to pay the military where they used denarii as the coin of payment (ibid). Butcher notes that unlike modern states, there were no loans to obtain or bonds to issue. The only way the government could raise money was either

raise taxes or debase coins (Butcher, 198). Because higher taxes were as popular then as they are now, debasement became the favorite course of action. As evidence, Butcher cites several emperors who fought expensive wars and debased their coins, including Trajan, Marcus Aurelius, Septimius Severus and Carcalla. The last two conducted extreme debasement but all four fought a lot of wars (n. 127 qtd. in Jones, 1968, 198). Butcher looks at silver content of coins to argue that it is "coin causing inflation" (194). I support the idea that when Rome debased the coins in order to pay the military, that was a bigger catalysis of inflation than just the payment of the military. I also argue that because we have better records on silver content and thus debasement than on inflation during the Roman Empire, then debasement is perhaps a better indicator of the relationship between the impact of paying the Roman army and inflation in Rome's economy.

Returning to Fleur Kemmers' research in *Coins for a Legion* helps provide further evidence that debasement contributed to inflation as a result of Rome paying its troops. According to a chart of Kemmers' research, the highest number of debased coins were found from the Republic, which included denarii from 211 to 44 BC or mid- to late-Republic (74). This ties to the first major period of debasement that resulted from all the civil wars.[101] Specifically, she says that about 10%, or 21 of the 212 Augustan coins, both denarii and quinarii, were debased (72). She notes that plating coins with silver was the most common method of debasement used in the found sample. Plating copper coins with silver made them appear more valuable because they looked like they had a higher silver content. In many of the examples found at the site, a punch

[101] The second most common debased coins were so called "legionary denarii" from 32 to 31 BC. There were 40 of those and five were debased. These were made by Roman generals, such as Mark Antony, in the field during the civil wars at the end of the Republic and the beginning of the Empire and often they were targeted towards a particular legion, hence the name.

mark was used to detect a copper base. Kemmers writes that the military did this as part of its efforts to detect debasement before paying soldiers (73-74). Such efforts were probably done to prevent unrest or even a mutiny. Specifically, fifty-five of the coins found had holes punched in them but it showed they were not debased while others were debased as determined by this method.[102] More than a quarter of all the pre-Augustan period coins had holes punched in them in efforts to determine if they were debased. Based on that test most were not debased and did not have a copper core below the silver exterior. In contrast, there were no coins from the Augustan period with punch marks on them, which is when debasement stopped. This hole-punching process seemed to be reserved for Republican coins and disappeared over time. The military seemed to take this precaution in the late Republic but not with Augustan or other Imperial coins. Eventually the military quit bothering with this, as silver coins were so regularly debased that there was no reason to examine the silver coins to confirm this.

Kemmers' research helps to substantiate the timeline that reflects the use of debasement in ancient Rome during the Empire, too. In Kemmer's table of coins from Tiberius' reign 15 denarii were shown and five of them were debased, or about one-third (88). She also notes that the coins were from two different series and that half of the coins from one series were debased. Although this suggests a high amount of debasement, scholars suggest that Tiberius did debase coins but nothing to the same extent as Nero. Looking at coins found from Nero's currency reforms, Kemmers notes that out of six Neronian denarii found, two were debased, or about one-third (92). Although the sample size is small, only one of three Neronian coins is debased suggesting

[102] Because of the debasement that happened in the late Republic many money changers would punch a hole in silver coins to determine metal content, specifically if it had a copper core to see if they were debased. In the East, the process of paying the troops often involved money changers as middlemen who the government hired to transport coins to the front. In the early days, if the coins were debased, then the money changes would not use them.

that debasement was lower under Nero than his predecessors, but still high. Perhaps the earlier belief that Nero was the first large debaser of coins was influenced by his notorious reputation. Kemmers reminds that Nero moved all the mints back to Rome and notes that Nero's reforms included reducing the weight of the aureus and denarius and debasing the denarius. Of the two debased coins found at the legionary site, one was pre- and one was post-reform, meaning one weighed more than the other (ibid). According to Kemmers, denarii of the pre-reform standard which weighed more because they had more silver, disappeared quickly as people began to hoard them, per Gresham's law (ibid).[103] Although a large number of coins were found from Claudius' reign, 122, only four of them were silver and only two were debased (91) in keeping with the other scholarship.

Kemmers' research showed a large number of debased coins from the reign of Titus, which is in keeping with the above discussion of how Titus continued the heavy debasement started by his father Vespasian. By the time of Titus, out of 12 denarii found at the legionary site more than half were debased—7 coins. (104, table 3.26).[104] As Kemmers notes, "A large portion consists of denarii, (17%) the majority of which was plated. This is a well attested phenomenon for this period, but it is as yet unexplained" as to why there was so much debasement at this time (104). I would argue that debasement was needed because the Roman military was heavily involved in wars as far away as Britain and Judea. As the size of the army continuously increased, the ability to find the precious metal resources to make new coins for this large payroll was avoided by debasement. This silver plating allowed coins to remain "silver" in the outward appearance

[103] Kemmers does not indicate whether any coins from the Year of the Four Emperors were debased including the 61 denarii and one aureus that were found from Vespasian's reign per the table 3.22 (100-1).

[104] It is notable that three of the debased Titus coins are hybrid types with two different pictures from two different series meaning suggesting low manufacturing quality at the time.

which avoided a panic that would result in hoarding non-debased coins and that would depress the economy.

Kemmers also notes that Domitian started to reverse debasement when he increased the amount of silver content in denarii back to the original Augustan standard in 82 AD (105). Domitian raised the military's pay by one-third in 84 AD (106). According to Kemmers, when financial problems occurred by 85 AD, he debased the silver denarii again and lowered the silver content to the pre-Neronian reform standard, which was still higher than the early Flavian period. This is supported by the Nijmegen coin find, where only two of the 18 are from the reform group and the remaining 16 were debased. (106).[105] Thus, Kemmers' research supports other scholarship that reflects extreme debasement that occurred over time in order to pay Rome's soldiers, including the legions at Nijmegen.

Here, again, my use of Kemmers' research adds a unique and additional layer of support for the link between Rome's debasement of coins to pay the costs of its military which negatively impacted Rome's economy and was linked to Rome's inflation. Although her research is impacted by factors like sample size and possible looting, the high number of debased coins found at this military site supports the theory that soldiers were paid with denarii that were the most heavily debased coins for most of the relevant period (prior to the introduction of the

[105] Given Nerva's short reign, about 16 months, it is not unexpected that only two denarii were found, and they were both from his third consulship. Kemmers does not note that they were debased. Kemmers' research shows a total of six silver coins, five denarii and one quinarius, during Trajan's reign. It is surprising that even one quinarius was found, because they were falling out of use by then. Indeed, this is the last one found at the site. In a more drastic effort regarding remedying debasement, in 107 AD Trajan's first currency reform was to order all old coins melted down and recycled because they were worn and had too high of a silver content (110). Kemmers does not identify whether the Trajan-era coins from the site were debased. According to Wassink, Trajan slightly debased the denarius later by lowering the silver content to on average between 87 and 90% (476). Similarly, two denarii from Hadrian's reign were found at the legionary site but, again, Kemmers did not mention that they were debased. Kemmers' research on silver coins ends with the Crisis of the Third Century, where three antoniniani were found, including one from the Gallic empire, all of which were heavily debased (112, table 3.37; 109). Later the site only produced bronze coins, so no further debasement issues arose.

antoninianus). Indeed, as Kemmers notes, during the late Republic soldiers were so mindful of the growing debasement and its concurrent inflation that the military regularly took extreme measures to avoid it. The findings she reports from Nijmegen support earlier research by Butcher and others both in the types of coins found and the evidence of debasement that they prove. All of this research builds strong support for my argument that Rome used debasement in order to pay its soldiers and that it had a negative impact on Rome's economy including an ever-increasing impact on inflation over time. Because debasement was necessary to create enough coins to pay the troops, I argue that it was a more important factor in tying paying the military to inflation because it was the catalyst.

This research on Rome's use of debasement further suggests that debasement was in some ways symbolic of Roman society. Harl in *Coinage in the Roman Economy* writes of Rome's history of using debasement as an economic tool to spur its economy (90). Although debasement was used frequently, Harl notes the harm it did to the Roman economy where trade with other countries was based on the intrinsic value of the metals in the coins. Debasement affected the economy negatively because Roman coins lost their reputation internationally. Indeed, Germanic tribes asked for Republican coins (pre-debasement coins), not Imperial ones. Similarly, merchants stopped sending the heavily debased denarii to India because it did not want the debased coins either (Harl, 1996, 91). Harl argues that what determined the success of Roman coinage was public trust inside, not outside where intrinsic value ruled (91).[106] Harl argues that in order for people to accept the value of the coins the people needed to have confidence in them. Thus, one of the "costs" of debasement was shown by the level of uncertainty, especially felt by

[106] For example, after the Dacian Wars, Trajan melted down older coins and recycled coins with a lower percentage of silver. At the same time, he reused the reverse and obverse designs from the Republic and early Empire to appeal to Rome's inherent conservatism (93).

citizens. This was in a way, an "inflation of the level of uncertainty." Marketplace transactions could still occur, but with a lower level of belief that the system worked properly or evenhandedly.

5. The Impact of the Bi-Metallic System on Rome's Inflation

Debasement further weakened the Roman economy because of Rome's adherence to the bi-metallic system. Wassink argues that although paying Rome's army impacted inflation, it was also complicated by its adherence to the bi-metallic system.[107] As discussed earlier, for most of its existence, Rome used the barter system with commodity currencies in everyday business. Wassink notes that originally, the Roman coinage system was based on bronze coins, and this was the unit of reckoning (470). Later it became based on the silver denarius and sestertius when Rome started trading with its Greek neighbors, especially after the Punic wars.[108] Thus, Wassink argues that Rome had a bi-metallic tendency. Later, Rome continued to use the silver sestertius as the reckoning unit, even after Augustus made it into a bronze coin (470). Octavian introduced a coherent monetary system in 31 BC that was bi-metallic and based on gold and silver, with additional bronze token coins for fiduciary money (Wassink, 1991, 470). I will explore how that contributed to inflation, which as discussed above, was tied to Rome's payment of its military.

According to Wassink, Augustus set the original bi-metallic ratio of 25 denarii to one aureus (294).[109] Thus, the weight standard for the denarius was 84 to a pound of silver (ibid). He

[107] Although additional factors may have impacted Rome's inflation, such as plagues or blights, because this paper is focused on coinage, military pay and the economy, they are beyond the scope of this paper.
[108] The denarius was probably created in 211 BC to pay taxes. Crawford argues, "From 211 to 89, the creation of the denarius coinage was made possible by the deliberate seeking of new sources of revenue and by windfalls from booty" (635).
[109] Per footnote 1, Jones explains that government officials would transport the ingots weighing one pound of silver and gold to the moneyers at the mint and tell the moneyer how many coins to make from it. Even though bronze and copper coins were not as important at this point, they still had an intrinsic value beyond the value of the metal in the coin—because the government/emperor said so.

set the value of the aureus as 25 denarii and also set the weight standard for the aureus of between 40 to 42 from a pound of gold (ibid). As noted above, Nero was the first to start debasing coins on a large scale during the Empire as part of his currency reforms of 64 AD, when he attempted to control the economy and the unrest resulting from the deflation crisis. To do so, Nero copied Augustus' successful financial policy, improved the currency system and stimulated the economy with large spending. This also included restoring the ratios of silver, gold and copper to Augustan levels when one aureus was worth 25 denarii. Nero also devalued the denarius and the aureus by 15 and 10% respectively by reducing the weight standard (474).[110] To clarify, he devalued or reduced the weight standard of both coins, but he only debased the denarius.[111] According to Wassink, this did not trigger inflation because there remained plenty of silver coins available for the economy. Thus, unlike others, Nero's "reduction in silver was not to make more money" (476).[112]

Wassink argues that for over 100 years after Nero the bi-metallic nature of the coin system caused problems for the Roman economy (475). He asserts that the main problem in the first two centuries AD was caused by a rise in the prices of silver compared to other precious metals. This resulted from the demand for silver for the Roman monetary system and the trade

[110] To further counter the people's unrest, Nero gave money to the people, did public works projects, including canals and the reconstruction of the City of Rome after the great fire and building a new palace and public games (Wassink, 1991, 474).
[111] This was made possible by boosting production in the silver mines in Spain (which Tiberius had nationalized) and making sure the treasury was full. Pliny the Elder mentioned that the gold mines in Dalmatia were also producing a lot during Nero's reign. Tacitus noted that they either appropriated, confiscated or opened the many temples of the treasuries throughout the country at this time too (ibid).
[112] Wassink notes that because of the Crisis, they knew the problems that deflation caused, so they tried to create as many jobs as possible. I would note that it seems that later emperors forget about the financial benefit of job creation when they replaced many paid jobs with slave labor. This led to high unemployment and was one of the many factors that led to the fall of the Western Roman Empire over time. This was compounded when Rome was not capturing as many slaves as it used to.

deficit with Germanic peoples who secured and hoarded their wealth in silver (ibid).[113] Additionally, the price of silver rose faster than the price of gold, sometimes as much as 11.4% under Marcus Aurelius (Wassink, 1991, 475). Thus, Nero started debasing coins in large part, according to the author, because of the rising price of silver as compared to gold.[114] Wassink notes that the economy was stable at the beginning of Marcus Aurelius' reign, but later, barbarian invasions coupled with a major plague outbreak caused the economy to decline. This is especially because the price of silver decreased, as the Rio Tinto mines in Spain were producing a major surplus (477). Previously, according to Wassink, Rome dealt with the price of silver increasing as compared to the denarius, and the Roman government had no experience with the reverse. While an increase in the silver content in denarii might have helped to offset this, hoarding would have defeated this effort, per Wassink (ibid). Instead, Rome increased the amount of silver by an imperceptible amount and started to debase it again after that, which seemed irrational according to Wassink (ibid). Between 170 and 192 AD, the succession of emperors either raised the silver content of the denarius or reduced the weight of the aureus. According to Wassink, it is unknown why Rome stuck to this monetary policy of a strict ratio. Wassink suggests it was so entrenched in daily Roman life, and through laws and otherwise, "it was considered impossible to deviate from it" (ibid). I would agree because of Rome's inherent conservativism, this probably furthered their dedication to the ratio.

By the time of Septimius Severus' high inflation, he returned to the policies of Augustus and Nero by infusing the economy with money. This occurred when he debased the denarius to

[113] Based on my research, I believe it seemed like Rome had a trade deficit with Germanic peoples, too.

[114] This caused Nero to devalue the denarius compared to the aureus, which was not devalued but its weight was reduced. During this time, the aurei was never debased but the denarius was devalued to keep the ratios intact. As a result, the aureus became more important, even though the denarius was the unit of reckoning (Wassink, 1991, 476).

between 50-60% silver, the lowest silver levels ever to that point. According to Wassink, Septimius Severus' rationale was to make the denarius a fiduciary token bronze coin like Augustus had done with the sestertius (478). Because of this, the intrinsic value of the silver in the denarius became lower than the value of the copper in the as, which was rendered obsolete (ibid).[115] According to Wassink, if Severus had converted Rome to the gold standard, then it would have helped to stabilize the economy (ibid). Instead, Severus issued large quantities of various denominations of coins, especially more types of aurei than usual, which was made possible by the seizure of the Parthian Royal Treasury in 198 AD (Wassink, 1991, 479). As noted earlier, when Severus granted a raise to the army, it infused money into the economy by allowing them to spend more.[116] Thus per Wassink, his various efforts at a stimulus did work in the beginning, as evidenced by interest rates decreasing by two percent, but this was the result of confiscations of seized gold. According to Wassink, this led to automatic tax increases and ended the economic setbacks from the Antonine plague and earlier problems from Commodus (ibid). But Septimius Severus failed to turn the denarius into a token coin because people did not trust it and it was too important to be degraded to a minor coin. Wassink said it led to the end of the bi-metallic system, because the value of the denarius was no longer tied to the aureus (ibid). Caracalla's first major economic reform was to introduce a new denarius to replace the old version. This coin, later called the antoninianus, weighed a little over five grams and had a fineness of 51% silver (Wassink, 1991, 480). He also reduced the weight of the aureus to 6.5 grams from 7.2 to restore the old ratio of 25 of the new denarii (antoniniani) to one aureus.

[115] "Based upon the assumption that the relative value of silver and copper during the whole Roman period remained constant at about 100: 1 (Bolin 1958, 303), one may calculate that with a fineness of less than 50.9% theoretically the intrinsic value of the denarius becomes less than 16 times the copper value of the important minor coin, the As" (Wassink, 1991, 478).

[116] According to Wassink, Septimius Severus also repaired roads, took over the cost of the imperial postal service, and did infrastructure work in the city of Rome and his hometown of Leptis Magna. Finally, he gave money directly to the people distributing grain and medicine and hosting lavish games.

According to Wassink this was an attempt to return to the old bi-metal standard (ibid).[117] But his reforms failed horribly (Wassink, 1991,480-481).[118]

Rome had a long history of adhering to the bi-metallic standard. Per Wassink, this reliance on the bi-metallic system was one of the major causes of the inflation of the Third Century AD. Contrary to common wisdom, the rationale was not to physically increase the money supply to pay more soldiers but was calculated to maintain the proper ratios in the bi-metallic currency system. Based on this detailed analysis, I agree with Wassink that paying the military was another factor that drove inflation in ancient Rome along with debasing coins to keep the balance in the values necessary for Rome's cherished bi-metallic system. Although Romans supported keeping the bimetallic standard because of their inherent conservatism, in reality it was to their economic disadvantage. Even Wassink suggested that once this adherence started to cause too many problems, Rome would have been better off adopting the gold standard instead (491). This would have given Rome a new standard to adhere to which was to their economic advantage.

6. The Impact of Inflation on Soldiers

With this evidence supporting the idea that Rome's efforts to pay the military impacted Rome's inflation, and as someone interested in the "common man" over the elites, it would be remiss for me not to explore what the impact of all this inflation was from the foot soldier's

[117] Although the bi-metallic system was not "officially" ended, in reality it was, according to Wassink.
[118] According to Wassink, Caracalla failed to communicate to the people about the new denarius, including how to trade it for the old ones, and the transition period was too long causing both coins to circulate at the same time instead of replacing the earlier debased denarius as he intended. His successor, Macrinus, stopped production of the new coin immediately, causing people to hoard denarii. By this time, on average prices had risen two and half times higher than Augustus' time, further causing the as to become obsolete. Macrinus' successor, Elagabalus, brought back the antoninianus (worth two denarii) occasionally during the year, making it scarce. Then Rome quit minting it.

perspective. This section explores the issue of how inflation impacted the soldiers of the Roman army, especially the infantry.

Jones, in what is possibly a chicken-and-egg discussion, notes that inflation made the costs of running the army more, both to the state and the soldiers (1953, 305). Much like Duncan-Jones' donkey analysis, Jones looked at the price of military uniforms to determine the prevalence of inflation. He notes a requisition order for one chiton and four cloaks in 138 AD for 24 denarii each (ibid). He cites another document known as the Diocletianic tariff (or Diocletian's price edict), which lists a military and "indictional chlamys" for 4,000 denarii (ibid). Citing Polybius' quote, Jones states that by the Fourth Century AD soldiers paid a solidus for the same garment, the indictional chlamys, or 3/4ths more than the Second Century price (1953, 295). Thus, Jones notes that "the great inflation of the 3rd century had a permanent effect of reducing the real wages and salaries of all employees of the state" (1953, 305). Acknowledging that this analysis was beyond the timeline of this thesis, the principle holds true that inflation gave soldiers less buying power. As noted in chapter 1, Jones writes that the private soldier of the second century had gross pay of 300 denarii. The pay of a private soldier in the fourth century was incalculable because it was made up of salary, rations and supplies in-kind along with the stipendium in debased denarii and the occasional donative in gold or silver (ibid). By the Fifth Century, Rome stopped paying the stipendium and instead started to pay the military in gold solidi. By that point, soldiers were paid four to five solidi per year for supplies with the occasional donative of five more solidi.[119] Cost for clothing was unknown, but there was one

[119] Emperors gave the troops donatives upon their accession. Although donatives are beyond the scope of this paper, many scholars argue that soldiers could barely scrape by on their pay, so it was supplemented by donatives that occurred so often that it went from a bonus to become considered a part of pay. Like the six-month stipendium payments, such time specific payments cannot be charted on Duncan-Jones' chart.

solidus per year for a chlamys. Soldiers were entitled to a chlamys, a pallium and sticharium and Jones estimates that each would cost one solidus and totals it at three solidi. He also estimates that weapons would cost three solidi. Jones concludes that, by the Fourth Century, soldiers had a stipendium of "negligible value" and a fifth of the occasional donative, about a solidus a year (1953, 306). He calculates the total salary at 12 solidi by the Fifth and Sixth Centuries AD (ibid). He writes that the Fifth and Sixth Century soldiers had "only a solidus to spare" and that "If deductions were not increased when the pay was raised to 300 denarii (12 aurei) soldiers of the second century would have been able to save about half of their pay, 6 aurei, equivalent to about 10 solidi" (ibid). He further writes that by comparison, inflation impacted the higher pay of government officials and the officers. This included higher paid officials such as the sexagenarii, centenarii, ducenarii and tricenarii who were paid 60,000, 100,000, 200,000 and 300,000 sestertii. The Praepositus of an army unit earned about twice the salary of a similar office in the Second Century, yet the value of the coins they were paid with were lower due to debasement/inflation (ibid). Thus, Jones advocates that the military was impacted by inflation and other negative economic factors of the time.

At first glance, I did not interpret Jones' analysis as a comparison of the impact of inflation on lower paying jobs versus leadership level. But later, he states that the common soldier lost much less than the officers did as a result of inflation. Jones reasons that the common soldier's needs were covered because he had to be "fed, clothed and armed and there was less spare to cut" (1953, 307). I challenge this argument. First, because the foot soldier had less to spare as Jones writes, I propose that inflation hit him the hardest. Both ranks of soldiers had to pay for their supplies. True, the cost of a praetorian guard's uniform and armor would cost more than the foot soldiers, but officers were paid more. After that, the inflation impacts would differ

substantially for items that cost both the same amount, like weapons (they both used the same gladius) and their basic food. Thus, the buying power under inflation would be substantially impacted when deducting the costs of those common items from the foot soldier's pay, which was proportionately lower than the higher salary of the officers as set forth in chapter 1. Although the officers probably ate better than the foot soldiers, that luxury should not factor into this analysis. Second, pay raises were implemented proportionally, so the officers always received a larger raise in total amounts than the troops. Third, in practice, corruption played a factor because the officers had the opportunity to "supplement" their basic salary through embezzlement and bribery often at the expense of the foot soldier. As Jones notes, officers had the tendency to embezzle pay from their men (1953, 307). Thus, similar to today, ancient Rome's inflation impacted most those who made the least.

In looking at paying the Roman military, we see the government "giveth and taketh away"—with each round of inflation soldiers might earn a pay raise to keep up with it, but they did not get ahead.[120] True, being in the army was better than not being a part of it. Most of the population did not get increases in income that may allow them to keep ahead of inflation. This is supported by Duncan-Jones, who notes that commodity prices and wages slowly rose in Egypt and that this was paralleled by the bread prices in Ephesus, the leading city in Asia. As Duncan-Jones writes, "this slow inflation probably existed in the empire as a whole and against its background the Severan army increases seem small in real terms" (1994, 32). But Duncan-Jones argues that in conjunction with payments in kind, the new rates made army service more attractive (1994, 33). Thus, increases in military pay may have helped soldiers keep up with

[120] This impact of inflation continues on, as Treadgold writes, to the time "of the late fourth century [when] what had been the soldiers' pay, the *stipendium*, had become almost worthless because of inflation; and around 44 it ceased to be paid at all" (303).

inflation, and this would encourage more people to join or stay on in comparison to those not paid by the government who suffered under inflation. I disagree because this did not allow soldiers to get ahead, particularly at the lowest ranks. Additionally, as Rome's military campaigns increased in duration and distance from Rome, the traditional pay of the soldier effectively decreased in value. A long campaign in a distant land meant that the soldier could not be expected to carry on his life with a family, or to take care of family land back in Rome. Short term, local and seasonal military expeditions exacted a lesser cost from the soldier than did the remote, several-years military expedition. Thus, when the soldier received less for his pay because the effects of debasement and the bi-metallic standard reduced the value of the denarii, it is unlikely that the soldier was optimistic about his pay.

7. Chapter Conclusion

This chapter explores whether paying the army caused inflation or other stressors in the Roman economy during the period of the mid-Republic to the end of the Third Century AD. Using modern economic principles to analyze the past is speculative, but based on the absence of Rome's financial records, I join others in using them to try to analyze economic conditions in ancient Rome. According to research by Duncan-Jones and Wassink during many of the time periods in this paper, inflation occurred when the cost of goods increased, which allowed consumers to buy less with the same amount of money. The scholarship supports my conclusion that paying Rome's large armies contributed to its economic inflation in at least three ways First, I determined a correlation between Rome's paying the military, its largest budget line-item and these periods of inflation based on the modern economic principle that infusing too much money into the economy drives up prices. I further supported this correlation when looking at times of military pay raises or increases in the number of troops and inflation.

Although paying the military shows a correlation with inflation, the evidence shows a stronger correlation between Rome's debasement of its coins and inflation based on Wassink and Jones' research on periods of inflation. Thus, I conclude that debasement was really the catalyst for Rome's inflation and that the earlier links to inflation were a function of the debasement that Rome implemented in order to pay its military. Kemmers' analysis of archaeological data supports my conclusions on debasement by providing further evidence of the types and times that coins were debased. I then note that in a way debasing coins mirrors the erosion of Roman society because public trust inside the Roman state was what determined the success of Roman coinage. I add to this another factor in inflation, Wassink's scholarship that paying the army also impacted Rome's economy and inflation because Rome had to change the silver content of the coins to make sure it could uphold the 25 to one ratio of its cherished bi-metallic standard of its currency. I finish with an analysis of the impact of inflation on the military and conclude that it negatively impacted the soldiers. That impact, however, was most strongly felt by the Roman infantry, who had less for Rome to take away whether by inflation or debasement.

While scholars have examined Roman soldiers' pay and inflation or debasement, there is no current research that synthesizes all of these arguments in a comprehensive analysis. Moreover, the evidence that supports the answers to these questions of how Roman soldiers were paid or its economic impact is surprisingly scarce. Scholars that have researched the subject have not all agreed on the conclusions or what those conclusions help illustrate, but progress is being made. My attempts to do so here are also complicated by concerns in using current economic principles to analyze the past. The future discovery of more artifacts may give further guidance. Yet, my comprehensive research makes a significant contribution to the classics field in its

focused exploration of how Roman soldiers were paid, the payment sources and how these payments impacted Rome's economy and its soldiers.

CONCLUSION

Although I support the scholarship that paying a large military contributed to Rome's inflation and that common sense would suggest that ever increasing salaries and armies in larger numbers would exacerbate that, economics are complicated, and the correlations are sometimes inconsistent. The scholarship does appear to show a relationship between inflation and paying the army, as well as pay raises and increased troop size until the end of the Empire. Yet, as discussed above, other factors in paying the troops, like the rigidity of Rome's bi-metallic standard and its use of debasement contributed to ancient Rome's inflation. Indeed, in the case of debasement, it was the catalyst for inflation. Thus, Rome's inflation is like modern inflation in that the road to it is not linear. The road is instead multi-variant, with a number of interactions resulting in inflation. If a bedrock belief of the study of economics is that people act with their best interests in mind, then it is logical that soldiers, farmers and merchants sought to get as much as they could from their money. Meanwhile, Rome's leadership wanted to maintain a strong army to withstand external and internal threats and expansion, without spending a lot of money to do that. While other actions may have resulted in inflation, the documentation of those actions is missing in the historical record, if it was ever recorded. Although ancient Rome was not sophisticated enough to create inflationary protections, I believe that debasement of currency such as that which occurred in Rome provides the best measure available to show that inflation occurred at the time. Yet, it raises a chicken-and-egg problem: did debasement contribute to Rome's inflation or result from it? Again, I believe that the stronger argument on debasement in ancient Rome is that it contributed to inflation, because the value of the coin decreased when the precious metal content also decreased. At that time in Rome, prices were dependent on the weight of the precious metal in the coin. Thus, with less buying power in debased coins, inflation

resulted. Debasement of currency presents a strong argument as the catalyst for inflation, as measured by the cost of goods—like Duncan-Jones' donkeys. Looking at the number of coins required for a given purchase does not present the only picture of inflation. Concurrently, looking at Rome's rigid adherence to the bi-metallic standard gives a further factor as to the cause of inflation at the time.

It is evident that Rome valued its army, even at the expense of the health of its economy such as inflation. The presence of a military organization was desired, but it appears that the acceptance of the need to finance the military organization was not as clear. Instead of paying the military what they were worth to Roman society, Rome's policy was to see what it could get away with such as debasing the payment currency or charging the costs of stoppages to leave the soldiers without much.

Appendix

Exhibit A

McMaster Museum, accession number 20030030001C

Exhibit B

McMaster Museum, accession number 20040010034C

Exhibit C

McMaster Museum accession number 20050040002C

Exhibit D

McMaster Museum, accession number 20020050002C

Exhibit E

McMaster Museum accession number 19870030004C

Exhibit F

McMaster Museum accession number 19880010003C

Exhibit G

McMaster Museum, accession number 19910050003C

Exhibit H

McMaster Museum accession number 19870020016C

Exhibit I

McMaster Museum accession number 19890010004C

Bibliography

Alston, R. "Roman Military Pay from Caesar to Diocletian." The Journal of Roman Studies 84 (1994): 113–23. https://doi.org/10.2307/300872.

Bruce Brace Coin Collection, McMaster Museum of Art, Hamilton, Ontario

Butcher, Kevin. Debasement and the decline of Rome. Coventry, England: University of Warwick, n.d.

Cassius Dio Cocceianus. Roman History. Translated by Earnest Cary and Herbert Baldwin Foster. Cambridge, MA: Harvard University Press, 1914.

Crawford, M.H. (1974) Roman Republican coinage (2 vols). London: Cambridge Univ. Press.

Dolata, Jens, Hans-Joachim Mucha, and Hans-Georg Bartel. "Mapping Findspots of Roman Military Brickstamps in Mogontiacum (Mainz) and Archaeometrical Analysis." In Advances in Data Analysis, Data Handling and Business Intelligence, 595–603. Berlin, Heidelberg: Springer Berlin Heidelberg, 2009. https://doi.org/10.1007/978-3-642-01044-6_55.

Duncan-Jones, Richard. The Economy of the Roman Empire: Quantitative Studies. 2nd ed. Cambridge: Cambridge University Press, 1982.

Duncan-Jones, Richard. Money and Government in the Roman Empire. Cambridge University Press, 1994.

Federal Reserve Bank of St. Louis. "Money and Inflation - the Feducation Video Series." Saint Louis Fed Eagle, January 12, 2023. https://www.stlouisfed.org/education/feducation-video-series/episode-1-money-and-inflation.

Goldsworthy, Adrian Keith. The Complete Roman Army. London: Thames & Hudson, 2003.

Harl, Kenneth W. Coinage in the Roman Economy, 300 B.C. to A.D. 700. Johns Hopkins University Press, 1996.

Heesch, Johan van. "Some Aspects of Wage Payments and Coinage in Ancient Rome, First to Third Centuries CE." Essay. In Wages and Currency: Global and Historical Comparisons, edited by J. Lucassen, 77–96. Bern-Berlin: Peter Lang, 2007. https://www.academia.edu/951090/Some_aspects_of_wage_payments_and_coinage_in_ancient_Rome_1st_3rd_century_AD_in_J_Lucassen_ed_Wages_and_Currency_Global_and_Historical_Comparisons_Peter_Lang_Bern_Berlin_2007_p_77_96?email_work_card=view-paper.

Jacobs, I. and Treadgold, W. (2014) 'Paying the Army in the Theodosian Period', in Production and prosperity in the Theodosian period. Leuven: Peeters.

Jahn, J. "Der Sold Römischer Soldaten Im 3. Jh. N.Chr.: Bemerkungen Zu ChLA 446, 473 Und 495." Zeitschrift Für Papyrologie Und Epigraphik 53 (1983): 217–27. http://www.jstor.org/stable/20183936.

Jarus, O. (2021) Roman-era skeleton found near Mount Vesuvius may be from famous rescue mission, LiveScience. Available at: https://www.livescience.com/soldier-skeleton-mount-vesuvius-rescue-mission.html

Jones, A. H. M. "Inflation Under the Roman Empire." The Economic History Review, vol. 5, no. 3, 1953, pp. 293–318, https://doi.org/10.2307/2591810.

Jones, A. H. M. "A History of Rome through the Fifth Century, volume II, The Empire: London: Macmillan, 1968.

Kropff, Antony. "The Bronze Enigma: Soldiers' Pay and Civilians' Taxes in the Northwestern Roman Empire Ad 69-197." Jaarboek voor Munt - en Penningkunde 106 (2019): 1–18.

Kemmers, Fleur. Coins for a Legion: an Analysis of the Coin Finds from [the] Augustan Legionary Fortress and Flavian Canabae Legionis at Nijmegen. Mainz am Rhein: Verlag Philipp von Zabern, 2006.

Polybius., W. R. Paton, F. W. Walbank, Christian. Habicht, W. R. Paton, F. W. Walbank, W. R. (William Roger) Paton, and F. W. (Frank William) Walbank. The Histories. Rev. Cambridge, Mass.: Harvard University Press, 2010.

Rainey, C. (2022) The age of 'greedflation' is here: See how obscene CEO-to-worker pay ratios are right now, NewsBreak. Available at: https://www.newsbreak.com/news/2671271830477/the-age-of-greedflation-is-here-see-how-obscene-ceo-to-worker-pay-ratios-are-right-now (Accessed: 28 July 2023).

Rose, Martha Lynn. "Ability and disability in classical Athenian oratory." in Disability in Antiquity, edited by Christian Laes, London: Routledge, Taylor & Francis Group, 2017.

Roth, J.P. (1999) The logistics of the Roman army at war: 264 B.C. - A.D. 235. Leiden: Brill.

Salati, Ornella. "New Evidence on Latin Military Pay-Records: 'P.Harr.' Inv. 183e 'Recto.'" Zeitschrift Für Papyrologie Und Epigraphik 203 (2017): 263–71.

Speidel, M. Alexander. "Roman Army Pay Scales." The Journal of Roman Studies 82 (1992). https://doi.org/10.2307/301286.

Speidel, Michael P. "The Pay of the Auxilia." The Journal of Roman Studies 63 (1973): 141–47. https://doi.org/10.2307/299173.

Suetonius, and K. R. (Keith R.) Bradley. Lives of the Caesars. Translated by John Carew Rolfe. Revised / with new introduction by K.R. Bradley. Cambridge, MA: Harvard University Press, 1914.

Sutherland, C. H. V., et al. The Roman Imperial Coinage. Edited by C. H. V. (Carol Humphrey Vivian) Sutherland et al., Second fully revised edition., Spink and Son Ltd., 1984.

Tacitus, Cornelius., Clifford Herschel Moore, and John Jackson. The Histories. Cambridge, Mass: Harvard University Press, 1970.

Taylor, M.J. (2020) Soldiers and silver: Mobilizing resources in the age of Roman conquest. Austin, TX: University of Texas Press.

Thorne, S.J. (2023) A Roman Legionnaire's pay slip and the siege at Masada, Legion Magazine. Available at: https://legionmagazine.com/en/a-roman-legionnaires-pay-slip-and-the-siege-at-masada/.

University of Osnabrück. "Beachtlicher Münzfund Auf Dem Schlachtfeld von Kalkriese." Archäologie Online, March 31, 2017. https://www.archaeologie-online.de/nachrichten/beachtlicher-muenzfund-auf-dem-schlachtfeld-von-kalkriese-3601/.

Wassink, Alfred. "Inflation and Financial Policy Under the Roman Empire to the Price Edict of 301 A.D." Historia: Zeitschrift Für Alte Geschichte 40, no. 4 (1991).

Watson, G. R. (George Ronald). The Roman Soldier. Ithaca, N.Y: Cornell University Press, 1969.

Zeichmann, C.B. (2018) §22 Gaius Messius son of Gaius, Database of Military Inscriptions and Papyri of Early Roman Palestine. Available at: https://armyofromanpalestine.com/0022 (Accessed: July 2023).