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**ASPECTS OF THE RELATIONSHIP BETWEEN THE
CENTRAL AND GALLIC EMPIRES IN THE MID TO LATE
THIRD CENTURY AD WITH SPECIAL REFERENCE TO
COINAGE STUDIES**

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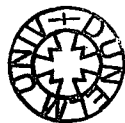
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**ASPECTS OF THE RELATIONSHIP BETWEEN THE CENTRAL AND
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DECLARATION OF ORIGINALITY

I confirm that no part of the material offered has previously been submitted by me for a degree in this or any other University. If material has been generated through joint work my independent contribution has been clearly indicated. In all other cases material from the work of others has been acknowledged and quotations and paraphrases suitably indicated.

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**ASPECTS OF THE RELATIONSHIP BETWEEN THE CENTRAL AND
GALLIC EMPIRES IN THE MID TO LATE THIRD CENTURY AD WITH
SPECIAL REFERENCE TO COINAGE STUDIES - ABSTRACT**

The revolt of Postumus in 260AD separated the Gallic provinces, Britain and Spain from the rest of the Roman Empire for a period of approximately fifteen years. During that period a parallel empire existed with its own imperial hierarchy issuing coins along the Roman model. This study seeks to determine to what extent the coins of the Roman state interacted with those of the Gallic Empire.

Chemical analysis has demonstrated that the severe debasement of the antoninianus did not happen at the same time in the Central and Gallic Empire, thus notionally the coins were different. Statistical analysis of antoninianus coin hoards using the cusum and spans tests were applied in order to detect changes within the structure and composition of the coin hoards through time and to determine whether coins from both sides were circulating together and under what circumstances.

Besides the consideration of base silver coin hoard data the gold coinage, the decline of the bronze coinage along with the imitative coins, the "local" or "barbarous" radiates have also been studied to summarise the overall pattern of coinage during the mid to late third century period.

The economic and social history have been considered, as have the writings of contemporary historians. These, along with a survey of other types of archaeological

data, in order to give a better understanding of the patterns and trends of the coin hoard data. In particular the occurrence of imperial names on inscriptions, along with chronological or titular evidence, has been used to demonstrate the areas of support for the two regimes and how this changed with successive emperors from both the Gallic and Central line.

Richard John Bourne

CHAPTER 1 - INTRODUCTION

In about 260AD a Roman general revolted in Gaul and declared himself emperor. Marcus Cassianus Latinius Postumus and the provinces that he ruled, the so called Gallic Empire, remained apart from the control of the central Roman emperors until 274. The provinces under Gallic control were subject to incursions from both the legitimate Roman regime and the peoples from 'Barbaricum' as well as subject to internal tensions and coups.

Relations between the separatist regime and the Central Empire have been the subject of academic speculation but notably little direct research. It has been postulated that there was no 'closed border' policy between the two empires, and that the apparent exchange of currency substantiates this view. It is intend to examine whether this hypothesis is tenable and whether the Central Empire coinage was, for the most part, excluded from circulation within the realms of the Gallic Empire. Similarly whether the coinage from the Gallic provinces did not circulate widely outside the areas of their control during the lifetime of the regime.

Coin hoards and site assemblages form the basis of the investigation with special emphasis being placed on the circulation of the products of the Central Empire in Gallic areas, particularly from the Rome and Milan mints. The Milan Mint was the only mint to strike coins for both regimes and the coinage circulation patterns from this mint thus deserve special consideration. Although under Gallic control for only a short period of time, albeit indirectly, it offers a chance to investigate whether there was discrimination

against or acceptance of the products of contending regimes.

The continued circulation of Gallic Empire coinage after the fall of the Tetraci will also be considered along with the production and circulation of the locally produced copies of the Gallic coinage so often encountered in mid to late third century deposits.

While numeric numismatic studies are not a new concept with, for example, the number of coins per year for particular spans of reigns being a common representation of monetary supply and loss, these are useful for making general comments about loss and inferred supply in a particular site/region/country. Few studies attempt to determine the subtle changes that may be evident by examining the types, issues or their specific circulation and enumerating them.

Two recent exceptions to this have recently been published by Schulzki¹ and Hopley². Schulzki examines the coinage of the Gallic usurpers and tries (from a sample of c.300,000) coins to determine their relative rarity. He also, through critical examination of what has previously been published, attempted to determine what are unofficial Gallic issues. He makes no attempt to draw any spatial or temporal conclusions from the coin finds.

Hopley, while considering the bronze coinage from the late first century through the second century, attempts to determine coin supply by issue and reverse type to the provinces and whether this was to military or civilian sites. The study relies heavily on dated issues and the assumption that there is no temporal movement of the bronze

coinage from one area to another.

The current study aims to borrow from both of the above works, Schulzki for determining what are and are not officially struck coins, along with some idea of comparative rarity of the issues. It is also intended to examine the spatial variation of the issues, although not individual reverse types. It can only do this within a broad chronology, given the paucity of dated reverse types amongst the 'antoninianus' or double denarius coinage. Bronze and gold issues will be considered but it is the base silver coinage that is the most numerous and therefore most frequently encountered in hoards and site finds. It is also hoped to demonstrate that the border between the Gallic and Central Empire regimes was not constant and that shifts in the frontier zone can be detected by an examination of the fluctuations in the supply of specific coin issues.

The above approach will, I hope, demonstrate that some of the questions posed by C.E.King, brought together in the conclusions of her 1981 B.A.R. paper, particularly the time that any movement of Central Empire coinage into the Gallic Empire, can be answered with regard to Gallic coin circulation patterns in the late third century³.

It is also intended to investigate other sources for the Gallic revolt and to marry the coinage evidence to these where possible, however this is not easy given the paucity of information other than the coins themselves. The distribution of the epigraphic remains will be examined and comparisons with coinage evidence made. The literary sources to will also be consulted for contemporaneous accounts of the history of the period.

It is, however, the coinage evidence that will form the greatest part of this study as much of the supplementary evidence is scant. Indeed Casey, when discussing Britain in the latter half of the third century, was forced to lament:

"like the rest of the empire Britain lost what has been called the 'epigraphic habit'. Pottery studies cannot yet define closely enough the differences in techniques and fabrics which might differentiate wares made in the middle of the third century from those made at the end, or even material from the first quarter of the next century. Easily classified fabrics such as Samian ware had long since ceased to be imported."⁴

Indeed the present knowledge of Gallic Empire coin hoards, coin circulation and economic behaviour was summed up by Clive Cheesman who was forced to admit that⁵:

"(Gallic Empire coin hoards) taken en masse, they do impart a more or less consistent sum of information, but it is information that is hard to assess. For that situation to change, a reliable method of translating numismatic data into historical language would have to be developed - at present unlikely"

The work that is presented here is intended to make a start to address his plea.

NOTES

1. Schulzki, H.-J; 'Die antoninianprägung der Gallischen kaiser von Postumus bis Tetricus (AGK)' Antiquitas Reihe 3 band 35 (1996)

2. Hobley, A.S; 'An examination of Roman bronze coin distribution in the Western Empire A.D. 81-192' British Archaeological Reports International Series 688 (1998)
3. King, C.E; 'The circulation of coin in the western provinces A.D. 260-295' in King, A and Henig, M; The Roman West in the Third Century: Contributions from Archaeology and History. British Archaeological Reports International Series 109 (1981) pp. 96-7, 98 note 5
4. Casey, P.J; Carausius and Allectus: The British Usurpers (1994) p. 31
5. Cheesman, C; 'The radiate hoards' in Bland, R and Orna-Ornstein, J; Coin Hoards of Roman Britain 10 (1997) p. 171

CHAPTER 2 - THE THIRD CENTURY: BACKGROUND INFORMATION

This chapter is not intended to be a full historical outline of the events of the century, regurgitated in chronological order from well rehearsed sources. It should, however, serve as a pointer to some of the empire wide events that took place and also some of the social changes that were evident in the period that have, at least, a slight bearing on the events in Gaul in the third quarter of the third century AD.

The third century began with the reign of Septimius Severus and ended with the joint reign of Diocletian and Maximianus. In between there was a string of legitimate emperors unparalleled in the previous two centuries along with numerous usurpations and momentary grasps at power and one is left with a feeling of great unrest (table 2.1). It would also be true to say that there was a significant change in the social structure through the third century.

On a grand scale it was the century of transition from the principate of Augustus in the first century AD through to the dominate of Diocletian in the fourth century¹. Caracalla granted citizenship to all free men within the empire. This was to have a knock on effect with regard to the legions and auxillia and, consequently, a profound effect on money production, supply and circulation².

Previously indigenous peoples (non citizens) from the provinces were generally only recruited to auxiliary units. The granting of citizenships to most branches of freed peoples brought the social status of auxillia up to that of the legionaries. This then

became a route or mechanism for provincials to improve their status and occupy more roles within the civil service, government and military command³.

Given the above, the decentralisation of Roman rank and opportunity was probably a great contributory factor the third century disruption and challenges to the imperial power. It is true to say that in the previous two centuries there were revolts lead by provincial military personnel. For example Galba, Vitellius, Otho and Vespasian in the first century and Clodius Albinus and Septimius Severus in the late second century all came to power via support of the military. What one cannot fail to observe is that there are more recorded such events in the third century. The list provided by Casey being case in point (reproduced as table 2.1)⁴. Between 218 and 300 AD he lists fifty five usurpations or revolts. Of these coins are extant for twenty five of them and eight became recognised as a legitimate emperor in their own right.

One must not, however, be deceived into necessarily thinking that the third century was more turbulent politically per se, just because more of the attempted usurpers are represented on coinage, which they frequently are. Some of it is, I feel, a function of the decentralisation of the Roman mint with imperial (as opposed to Greek imperial) coin being struck at maybe up to a dozen or so locations throughout the third century. This meant that access to minting facilities not available to many earlier usurpers became available and with this also access to decentralised treasuries, or at least sources for coinage metal. This is in marked contrast with the one or two imperial mints of the first and second centuries.

Table 2.1: Usurpations and revolts 218-300 (after Casey (1994) with minor modifications)

Date	Name	Place	Ruler
218	Elagabalus	Syria	Macrinus
218/22	Seleucus	Syria	Elagabalus
218/22	Uranius	Syria	Elagabalus
218/22	Gellius Maximus	Syria	Elagabalus
218/22	Verus	Syria	Elagabalus
222/35	Taurinus	?	Severus Alexander
222/35	Maximinus Thrax	Germany	Severus Alexander
235/38	Magnus	Germany	Maximinus
235/38	Quartinus	Germany	Maximinus
235/38	Gordian I/II	Africa	Maximinus
235/38	Balbinus/Pupienus	Italy	Maximinus
238/44	M. Annius Sabinianus	Africa	Gordian III
238/44	M. Iulius Philippus	Persia	Philip
244/49	T. Cl. Pacatianus	Pannonia	Philip
244/49	Iotapianus	Syria	Philip
244/49	Marcus	Syria	Philip
244/49	Sponsianus (?)	?Pannonia	Philip
244/49	Trajan Decius	Pannonia	Philip
249/51	T. Iulius Priscus	Thrace	Trajan Decius
249/51	Iul. Valens Licinianus	Italy	Trajan Decius
253	Uranius Antoninus	Syria	Trebonnianus Gallus
253	M. Aem. Aemilianus	Moesia	Trebonnianus Gallus
253	P. Lic. Valerianus	Germany	Aemilian
253	M. Silbannacus	?Germany ?Italy	Aemilian
253/59	Mareades	Syria	Valerian
260/68	Ingenuus	Syria	Gallienus
260/68	P.Cornelius Regalianus	Illyricum	Gallienus
260/68	T. Fulvius Macrianus	Persia	Gallienus
260/68	T. Fulvius Macrianus, jun.	Persia	Gallienus

Table 2.1 continued

Date	Name	Place	Ruler
260/68	T. Fulvius Quietus	Persia	Gallienus
260/68	C. Piso Frugi (?)	Thessaly	Gallienus
260/68	Valens	Macedonia	Gallienus
260/68	Ballista	Syria	Gallienus
260/68	Mussius Aemilianus	Egypt	Gallienus
260/68	Memor	Egypt	Gallienus
260/68	M. Aelius Aureolus	Italy	Gallienus
260/68	Trebellianus	Isaura	Gallienus
260/68	Celsus (?)	?Africa	Gallienus
260/68	Saturninus	?	Gallienus
260/68	M. Cass. Lat. Postumus	Germany	Gallienus
270/75	Domitianus	?Illyricum	Aurelian
270/75	Urbanus	?	Aurelian
270/75	Septimius	Dalmatia	Aurelian
270/75	Firmus	Syria	Aurelian
276/82	Bonosus/Proculus	Germany	Probus
276/82	C. Iul. Saturninus	Syria	Probus
283/84	M. Aurelius Iulianus	Pannonia	Carinus
283/84	Sabinus Iulianus Diocles (M. Aur. Diocletianus)	Italy	Carinus
284/305	Domitius Domitianus	Egypt	Diocletian/Maximianus
284/305	Aurelius Achilleus	Egypt	Diocletian/Maximianus
284/305	Eugenius	Syria	Diocletian/Maximianus
284/305	Iulianus	Italy	Diocletian/Maximianus
284/305	Carausius	Gaul/Britain	Diocletian/Maximianus

The decentralisation was probably brought about by the debasement of the silver coinage which in turn triggered a devaluation (ie inflationary economics). In order to produce enough silver coin for the triannual payment of the troops, as well as applying basic economic principles about the transportation of goods (ie high value, low bulk goods are better able to withstand the costs of transport than low value, high bulk goods (Christaller's central place theory)), more mints were required⁵. The decreasing value (purchasing power) of the coinage required the establishment of provincial mints to furnish the regular payments to the army.

One may view the establishment of the mints in Gaul, Milan, Viminacium and the east in this way and track the imperial campaigns in such a manner and this will be done in the following chapter when discussing the revolt of Postumus in Gaul and the period leading up to his usurpation.

The debasement and the decentralisation of minting away from Rome is further examined by Tyler⁶. He recognised that the eastern wars from the time of Marcus Aurelius and the problems in the Danubian provinces were placing a burden on state finances. The consequence of these wars was to initially lead to a reduction in the weight of silver in the denarius through the reign of Septimius Severus leading to the introduction of the double denarius or antoninianus first issued by his son, Caracalla, which contained the silver of only 1½ denarii, probably around the time of a doubling in military pay⁷. This had an effect on the local minting in the east where, in particular, bronze coins were being produced for local circulation. The alterations in the alloy of the Roman coins lead to repeated revaluation of the local coins, marked by overstriking

or countermarking, and their eventual demise when the locally produced coins of Roman design became so debased as to be used in everyday transactions⁸. It was also noted that when the eastern mints were producing antoniniani they need not necessarily contain the same amount of silver as their counterparts from the western mints⁹. Indeed higher silver contents are experienced in Roman coins of eastern manufacture during the third century, particularly in the period of the Persian campaigns through to the mid 260's.

It may seem a little odd that there are costs associated with war as the army would have to be equipped, paid and fed whether at war or peace. This is explained by Crawford using passages in Dio who implies that war involved extra expenditure on pay for soldiers¹⁰. Dio also refers to *enkyklia* (regular expenditure) and *anankaia* (special expenditure). Using other texts, such as Herodian, Crawford is able to demonstrate that army units were under strength at times of peace and only brought up to strength when required. The more expensive to maintain legion is more under strength than the auxiliary units.

Birley, while agreeing in principal to this idea feels that it is not sufficient to justify the costs of a campaign in extra troops alone, adding that ordnance is required and infrastructure in order to move men and equipment¹¹.

Tyler further postulates that the eastern mint serving Gallienus' campaign needs maintained a higher alloy composition than the mint of Rome which was providing coins for mixed use including civilian circulation. Analyses and weights published recently by Cope et al would seem to support this difference¹².

Particularly one should note the 'SPQR' marked coins from an eastern mint. Its location is not certain but the continuation of the mark into the reign of Claudius II leads Elks to place the issues towards the end of the reign of Gallienus, assuming no break in mint operation takes place¹³. While the weights may be comparable with the last series from the Rome mint, the so called 'animal series', the silver composition is demonstrated to be two to three times greater¹⁴.

The intense military activity during the third century should have left their mark on military structures throughout the empire but was this so? Schönberger has published two major surveys of the German frontier during Roman occupation^{15,16}. Although there were incursions across the German border right through from the time of Caracalla Schönberger concludes that there is little solid evidence of fortification or enhancement of the physical defences to any degree. It is perhaps surprising the lack of evidence for Gallienic fortifications when one looks at the extensive works undertaken elsewhere on the limes or their hinterland under Gallienus. Milan, Vindonissa, Nicaea and Miletus were all fortified. One also reads in the *Historia Augustae* that:

"....the Scythians sailed across the Black Sea and, entering the Danube, did much damage on Roman soil. Learning of this, Gallienus deputed Cleodamus and Athenaeus the Byzantines to repair and fortify the cities..." (SHA vG XIII.6)¹⁷

There does seem to have been some strengthening of the German defences under Severus Alexander (AD 222-35) at some sites, for example Zugmantel, whereas others had defences destroyed which were not restored (Schönberger cites Holzhausen as being

a case in point). Even during the period of the Gallic regime there is little evidence of an improvement of military sites, somewhat surprising if one considers a nationalistic tendency and fear of barbarian invasion as being motives for the revolt of Postumus¹⁸.

Another military feature that can be put down to the third century, although later in date than the Gallic revolt, is the (beginning at least) construction of the Saxon shore forts of southern Britain. Their date and, to some degree, function is still the subject of debate but there is some coin evidence to suggest that their construction was certainly started during the third century¹⁹.

Further evidence of a lack of defensive security is suggested by Austin and Rankov²⁰. They note that there were only three permanently occupied outposts they are able to identify along the European border with Barbaricum from the period of the Marcomannic wars through to the fourth century. These they locate at Divitia (Deutz near Cologne), Upper Germany, along with Brigetio and Transaquincum (Rákospalota) from Lower Pannonia.

This lack of security or perception of security, evidenced perhaps by the lack of physical presence, may be the cause of the fortification of the urban settlements. Frere is able to suggest a number of British locations where such defensive measures took place sometime during the third century, for example at Verulamium²¹. Here a small deposit of five coins, ending with one dating to the period 227-9 was concealed under the floor of a tower in the walls. One may argue that given the small size of the deposit one cannot make any sound conclusions about the date but there was a second hoard found,

this time in the rubble of the tower after it had collapsed due weak foundations. This find terminated with coins of the period 275-85.

The building of walled cities was not just a British phenomenon. Both Augst and Trier have walls which date to sometime in the third century²². Even the walls of the first city, Rome, were rebuilt during the reign of Aurelian. What one cannot be sure of is that the building of walls around urban settlements throughout the century was always a reaction to the same stimulus.

There were structural changes within the army for example the legions being stripped of their cavalry to fulfill much less a role of messengers than as an independent fighting force at the instigation of Gallienus²³. Also the highly trained light infantry, the *lanciarri*, were organised into separate units²⁴. Indeed, as De Blois suggests, there was a synchronisation of the legions and *auxillia* and military became distinguished on the basis of skills or methods of combat rather than origin²⁵.

There is the suggestion that these changes strengthened and improved the Roman fighting machine rather than serving to weaken it²⁶. However beneficial or detrimental the changes in the army were a military and imperial disaster befell the empire around AD 260.

The Sasanid Shapur moved deep into Roman territories on the Euphrates, destroying a Roman army of 60,000 before moving into Syria when Antioch was captured. Frye dates these campaigns to 253-7²⁷. There is certainly evidence that the eastern mint coinage of

Valerian and Gallienus are interrupted at Antioch around this period²⁸. Valerian advanced an army of 70,000 against Shapur and the two met in battle near Edessa. During the battle the Romans were defeated as a result of the treachery of Kiriades and Valerian was captured.

The event is recorded in an inscription at Naqsh-e Ruscstam in Fars:

"And beyond Carrhae and Edessa we had a great battle with Valerian Caesar. We made prisoner ourselves with our own hands Valerian Caesar and the others, chiefs of that army, the praetorian prefect, senators; we made all prisoners and deported them to Persis."²⁹

The date of this event is uncertain and has been postulated as being between 257 and 261. The date, I believe, is not too important and it is probably a reflection of the shame felt by the Roman regime that the date is not well publicised. Carson, in consideration of the numismatic records, particularly the annually dated Alexandrian tetradrachms, and the historical record concludes that the capture was probably during the second half of June 260³⁰.

The precise date of this event is, I feel, of little consequence. What is probably more important is when the event was recognised by the Roman state as this may have contributed to a feeling of uncertainty that precipitated the revolt in Gaul. The chronology of the events in Gaul will be discussed later.

There were other significant border incursions throughout the century, the Goths and barbarian tribes from the borders of the Black Sea were raiding Asia Minor while other bands of Goths were moving through the Balkans and into Greece. The Marcomanni invaded Pannonia in 254. The Alemanni were penetrating Raetia and the Agri Decumates and both the Alemanni and the Franks were threatening the Rhine border.

All these pressures from external forces were perhaps compounded by internal pressures and change. The frequent incursions and wars lead to frequent destruction of crops in rural area and famine was a recurring feature³¹. This combined with a manpower shortage in some areas through disease or plague.

There was also in the west seen to be a move away from urbanisation towards the large rural estate, buying land made available by bankruptcy or abandonment, farmed by small tenant farmers. This was driven not only by the security that the rural environs offered, the towns were targeted rather than the villas by barbarian invaders as they offered greater potential wealth, but also by fiscal pressures exerted more rigorously on urban dwellers³².

This anti-urbanism is explored a little by Reece identifying that the Civitas Capital in Roman Britain was typically founded in the latter half of the first century with growth through the second. New urban building in stone was rare in Britain after the first quarter of the third century.

Around the mid to late third century there are signs that there was a significant increase

in rural development in Britain with the construction or enhancement of villas. Salway suggests a couple of possible explanations for this³³. First of all it may be a demonstration of a 'flight of capital' from Gaul or a flight of foreign land owners as a reaction to the civil wars on the European mainland, the barbarian raids and the increased financial responsibilities of wealthy urban residents. He even postulates that the movement of wealth and the importance/status of the inhabitants of the island increased imperial interest in the defence of the island, evidenced by the construction of the Saxon Shore forts.

All this is different to the continued occupation and urban lifestyle witnessed in Italian towns with France and Belgium occupying the ground in between³⁴. It appears that the antiurbanism increased the further away from Rome one gets. It is as if the loyalty or the ties to Rome are weakening in the provinces.

Wightman, while recognising the general trend of the senatorial ranks moving out of the cities, argues against Reece on two counts³⁵. First of all she counters the movement away from urban centres by the upper classes with (an enforced?) movement of the wealthier lower ranks into the cities. Secondly she postulates the influence of major urban centres on the effects above, rather than it being a straight relationship of distance from Rome. Thus Trier, with it being the preferred location of the imperial court in the mid third century, may have accelerated this movement.

This rural decentralisation and antiurbanism in the western provinces may be evidenced in other ways, for example changes in export and trade patterns. One of the ways

increasing urbanisation was manifest was the requirement to generate income by exporting produced goods in order to pay taxes³⁶.

Using evidence from shipwrecks Hopkins suggests that the reduction in Mediterranean wreck indicates a decline in waterborne trade. One must treat this with some caution as the reduction of wrecks may be due to other factors such as a reduction in piracy and the vagaries in the dating of wrecks.

Keay uses other evidence to suggest an export decline from the western provinces in the third century³⁷. By looking at the evidence from the port of Ostia in the form of amphora sherds he identifies a decline in the Spanish sherds in the third century from the export of garum, wine and olive oil. Thus assuming no recycling of the transport vessels there was a reduced export. This, taken in conjunction with the work of Carandini and Panella which shows the increase in North African wares would suggest that an alternative source of supply had been found³⁸.

Reece also suggests that trade in certain commodities over long distances suffered through the third century³⁹. The examples he cites include red slipped pottery or Samian ware which was made at significant production centres through the first and second centuries which then traded their wares widely. In the third century both the production of these wares and their distribution were affected and by the fourth century production of variable quality wares was at a much more localised scale. Similarly he notes the same sort of trend with carved marble, glassware and amphorae. He supports the idea of Hopkins that seaborne trade declined between the second and fourth centuries.

Trade with external bodies also needs to be examined. Brogan noted that the 'troubles' of the third century affected the trade with 'free Germany' less than other areas and states that Gallic Empire coinage may be found in areas upto and beyond the River Vistula⁴⁰. She does, however, stop short of suggesting that the trade was with the Gallic regime, acknowledging that the coins cannot be securely dated in their deposition. Brogan concentrates on Roman exports noted especially the trade in wine from the Rhine and Moselle vineyards.

With regard to Roman imports he concludes that there is very little evidence, amber from the Baltic and Saarland tending to disappear from Roman jewellery after the second century AD. Whether this is a dictate of fashion or indication of an interruption of the supply route is not clear.

The main import from Barbaricum (or perhaps better expressed as the external migration of Roman coinage, particularly gold) during the third century appears to be mercenaries. The gold coins turning up as grave goods in Barbaricum seem to be the main evidence for this practice. These deposits are difficult to date and generations may have passed between the coin being struck and it being interred.

Turning to Gaul it is of some interest to expand on Casey's assertion from my introductory notes about the inscriptional history of the third century⁴¹. There is some numeric evidence for the decline in the 'epigraphic habit' in the third century province of Gallia Belgica in particular. Wightman notes that if one were to take the period from the reign of Augustus through to the usurpation of Postumus in AD 260 and divided it in

half, three quarters of the inscriptions would date to the second half but after 260 there is a significant drop off in the third quarter of the century⁴². To this end Drinkwater is only able to record around forty-nine Gallic Empire inscriptions with any certainty and these will be discussed further later on in this work⁴³.

Wightman also notes a geographical variation within the province in terms of absolute numbers. As she recognises, and has also been noted elsewhere, this need not be a true sign of geographic variation as intensity of archaeological investigation and frequency or standard of finds publication must be taken into account.

In conclusion the third century was a period of disruption and change, the like of which hadn't been seen over the previous hundred and fifty years or so. The disruption lead to change, both through the increased ambitions of provincials after Caracalla's Edict conferring broad citizenship to many but also as a reaction to adversity. It is against this background that the revolt of Postumus should be set.

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CHAPTER 3 - THE GALLIC REVOLT: HISTORY AND CHRONOLOGY

The previous chapter set out some of the changes that were taking place in the Roman Empire as a whole. I want now to turn to the specific events which lead up to the revolt of Postumus and follow the major events of the Gallic Empire and beyond into the period post capitulation.

The events of the 250's must have played a significant part in the revolt. As noted in the previous chapter by 255 there was a proliferation of mints striking Roman coins (as opposed to the local production of, ostensibly, base metal coins, the Greek Imperial series, which were in decline). These mints appear to be established where either the current military campaigns were or where the emperor was based, which often coincided with the military activity.

The siting of the new mints in such locations reflects the devaluation of the currency through the third century. In order to supply the money to the people who require it, that is the military, such increasingly large volumes were required that there was no other option than locate the mint nearby. Transporting large volumes of coinage across the empire from a centralised mint at Rome was not feasible.

The decentralisation of the money supply in this manner may have made it easier to contemplate revolt by the military. In order to sustain a revolt and secure the loyalty of the army pay must be maintained. If the mint was taken during a revolt then continuation of pay could be ensured. If pay was dependant on a centralised mint then the government

would simply withhold pay to the rebel legions, thus potentially acting as a disincentive.

Eutropius records that there was a revolt in Gaul in AD 252, suppressed by Trajan Decius (Eutropius IX.4)¹. This must have been easily quashed as Eutropius gives no further details. Drinkwater suggests that this was not an early manifestation of Gallic nationalism (the reason he champions for Postumus' rebellion) but rather a reaction to security fears due to incursions by barbarian peoples such as the Alemanni and Franks². No coinage is extant from this revolt but this is not to be unexpected if my hypothesis is correct as there was no mint operating in Gaul at this time.

By contrast there were three revolts in the western and central provinces during that period which did leave an impact on the numismatic record of the period.

Aemilian was governor of Pannonia and Moesia when, in 253, he revolted against Trebonianus Gallus. Aemilian gained control of the Rome mint as well as a Balkan mint (Viminacium?) during his brief reign (Eutropius puts it at about three months) following the murder of Gallus.

The second was that of P. Licinius Valerianus. Eutropius records that Valerian was serving in Raetia and Noricum (Eutropius IX.7)³. He was summoned by Trebonianus Gallus to come to his aid to help put down the revolt of Aemilian. Gallus and his family were murdered before meeting the army of Aemilian. Before the army of Valerian could meet Aemilian he too was murdered and Valerian was in control of the whole empire.

Somewhere between these two revolts was apparently the revolt of Silbannacus. He has left only a scant record in the numismatic history of the third century. The first specimen of his coinage was reputedly found in the Lorraine region of France and was favoured to be from around the time of Philip on stylistic criteria. Indeed, in Casey's list of third century usurpers he is placed in Germany around 249 which is not far from this area⁴.

Recently a second specimen has come to light from a secure archaeological context⁵. It is an obverse die duplicate of the British Museum specimen, however the reverse is different. It is the reverse which may be a clue to the date and mint of the coin. The reverse on the new coin is MARTI PROPVGT, Mars standing left, leaning on shield and holding a reversed spear. This mirrors a coin type of Aemilian from the Rome mint although not, apparently, a known die duplicate (RIC 6)⁶. Silbannacus' revolt may thus be redated to the early 250's and relocated to central Italy.

The Sasanid Persians invaded Roman territory in the east. Valerian was proclaimed emperor in the circumstances outlined above and his son, Gallienus, was soon elevated to the role of co-emperor. An army was assembled on the Danubian frontier to meet the Persians and it is around this date (253-4 AD) that the mint of Viminacium starts to coin antoniniani, that is, silver money akin to the products of the mint of Rome. The mint had been operating for some years previous (since early in the reign of Gordian III, 238-44), coining bronzes bearing Latin legends of a local nature. If one were to follow the models of coinage supply of people such as Harl then central government was generally only concerned with the supply of precious metal coinage, base metal coinage required for local transactions was not their concern⁷. One could view the establishment of a mint

c.240 striking local bronze coinage through to the establishment of a full branch mint as a reaction to the need for high volumes of coinage in a particular area, for example, to meet the needs of an amassing army.

Valerian moved east to meet the Sasanid Shapur while Gallienus remained in the Balkans. Around 255-6 Gallienus was joined by his son, Valerian Caesar but by 257 Gallienus had relocated to Gaul to counter the barbarian attacks. With him the bulk of the Viminacium mint also moved to Gaul, the location of which will be discussed in Chapter 5 below. Valerian Caesar remained in the Balkans with (the praetorian prefect?) Ingenuus as his guardian.

By 258 Valerian Caesar was dead, possibly as the result of a plot by his protector and around the same time the mint of Viminacium closed. He is succeeded by his brother Saloninus who joined his father in Gaul. It was not long however before Gallienus was on the move again (c.259), this time to Milan, depleting the German frontier of troops. Saloninus remained in Trier with the praetorian prefect Silvanus.

As noted in the previous chapter it was in the period 258-60 that Valerian Augustus was captured and killed by the army of Shapur⁸ and it was the public acknowledgement of this act which may have been the encouragement that the western barbarians needed to renew their attacks on Germany, Gaul, Spain and the Balkan provinces. This, and the visible weakening of the defensive army on the German border.

Both Drinkwater and De Blois use the barbarian attacks as being part of the reason for

the revolt of Postumus though the ultimate driving motives each perceives differently^{9,10}. Drinkwater views the revolt of Postumus as being symptomatic of a deeper Gallic nationalistic tendency, particularly from Gallic Belgica. His views are supported by a short passage in the life of Gallienus in the *Historia Augusta*. Whilst this source should be treated with caution due to the untrue nature of some of the text and also because of the biased opinion against Gallienus the passage gives a probable insight into Gallic thought and feeling:

"Now while Gallienus, continuing in luxury and debauchery, gave himself up to amusements and revelling and administered the commonwealth like a boy who plays at holding power, the Gauls, by nature unable to endure princes who are frivolous and given over to luxury and have fallen below the standard of Roman valour, called Postumus to the imperial power" (*Historia Augusta, The Two Gallieni IV,4*)¹¹

De Blois suggests that Postumus was driven by ambition but was held back from invading Italy and making an attempt at absolute Roman power by the continued attacks from Barbaricum.

I have some difficulty in accepting De Blois' arguments over Postumus' motives for revolt. If, as we are supposed to believe, Postumus set his sights on the central seat of authority in Rome he probably would not be distracted by having to defend the German border. He would surely concentrate his efforts in trying to defeat the existing Roman regime whilst defending his flank.

Secondly, when Aureolus revolted against Gallienus taking with him the new mobile cavalry army which was stationed at Mediolanum (Milan) Postumus did not seize the opportunity of having an ally in Aureolus with a substantial army to invade Italy and seize the Roman throne. This may have been because, at the time, Postumus was facing a challenge from disaffected elements within his own army which culminated in the brief reigns of Laelianus and, latterly, Marius and thus unable to commit troops for an invasion of Italy.

Thirdly, whilst it is not unknown for usurpers and pretenders to confirm on themselves imperial titles and honours, for example coins of Carausius record consulships and periods as tribune (eg. RIC 393 "SAECVLARES AVG COS IIII"¹²; "PM TRP IIII COS PP"¹³; "PM TRP IIII C PP"¹⁴), there is no evidence that Carausius did anything other than award himself the titles. This is not the case for the Gallic usurpers. The Gallic usurpers associated others with themselves in the consulship and even nominated consuls in pairs excluding themselves. Examples include the joint consulships of Censor and Lepidus, each for the second time, and Dialis and Bassus¹⁵. The individual pieces of inscriptional evidence will be dealt with later.

Eadle counters the argument of troop depletion on the German border as being a signal for the Barbarian armies to invade, leading to the dispirited remnants of the Roman army to revolt against Rome in favour of Postumus¹⁶. He believes that the account of Aurelius Victor is taken too literally when he states that the frontier forts in southern Germany (Germania Superior, the region where Postumus was probably based) were evacuated when Valerian recalled the troops from Raetia in AD 253, inspiring Alemannic attacks

later in the year. The destruction horizons of 253 and 259/60 (the approximate date of Postumus' revolt) being difficult to distinguish. If anything Eadle believes that it was the Franks threatening Germania Inferior to the north which would have posed the greater danger.

The revolt of Postumus against the central regime triggered an immediate response. The Caesar Saloninus, whom Gallienus left in Gaul, was forced to proclaim himself Augustus. This is evidenced by what must have been a very short lived coinage if the number of known specimens is anything to go by¹⁷. Shiel is able to list only fifteen coins in a population that is highly die linked. Gilljam ups this number to thirty-one and new ones are being added¹⁸. Bland suggests that the increase of sixteen specimens is partly due to a better recognition of the series since Shiel's publication, before adding three new specimens from the Stevenage hoard¹⁹. The three new coins he adds are all from new dies which indicates that the issue may not be quite as small as was first thought.

This issue from the Gallic mint cannot be contemporary with the issues of Postumus (see chapter 5 below for a discussion of the mints) but occurs before them. It is not reciprocated elsewhere that strikes issue for Saloninus, for example Rome. This suggests that his proclamation as emperor was a purely Gallic response to the crisis.

After a siege at Cologne Saloninus and Silvanus were defeated leaving Postumus ultimately in control of the western provinces.

In order to place the chronology of the Gallic regime in its proper context it is worth

tabulating the succession of the official emperors as much of what follows depends on trying to secure a date for the start of the breakaway rulers. Drinkwater summarises the absolute chronology of the Central Emperors thus, albeit with some modifications taking into account dates from his text not tabulated:

Table 3.1 Central Empire chronology 253-75

i.	Accession of Valerian I as Augustus Accession of Gallienus as Caesar, then joint Augustus	Late Summer / early Autumn 253
ii.	Appointment of Valerian II as Caesar	255/6
iii.	Death of Valerian II	257?
iv.	Appointment of Saloninus as Caesar	early 258?
v.	Capture of Valerian I	?
vi.	Saloninus proclaimed Augustus	Summer 260?
vii.	Murder of Saloninus	Summer 260
viii.	Murder of Gallienus Accession of Claudius II	Late Summer/early Autumn 268
ix.	Death of Claudius II Accession of Quintillus	Late Summer/ early Autumn 270
x.	Death of Quintillus	Autumn 270
xi.	Accession of Aurelian	270
xii.	Death of Aurelian	Late 275

There are some slight discrepancies around the actual dates of these events, again highlighted in Drinkwater's notes. Most are in the order of a month either way. There are a couple which require expansion.

The first of these is the death of Valerian I, or at least the official recognition of his relinquishment of power. Among the pieces of data that Carson uses is the date on the Egyptian billon tetradrachm coinage²⁰. The reckoning of these issues starts on 29 August. The first issues of Valerian and Gallienus, marked A, are relatively abundant and Carson is able to cite inscriptional evidence that Valerian and Gallienus were Augusti by 22nd October 253, thus establishing the beginning of their reign by deduction as late September / early October 253.

Similarly the latest date known of Valerian I on the billon tetradrachm series is year H (corresponding to year 8, not 10 as Carson suggests (a misprint?)). This would appear to be struck after 29 August 260. The usurpation of Macrianus and Quietus interrupts the Central Empire coinage from Alexandria. This must have been early in the (Alexandrian) year as they are mentioned in a papyrus dated 29th September 260 (Oxyrhynchus papyrus 1476)²¹.

There is a problem with the chronology of Aurelian. He appears to have been proclaimed around the same time as Quintillus and died in late 275 yet there are Egyptian tetradrachms known which are dated to the seventh regnal year, on the face of it dating them to 276, illustrated by Price as follows²²:

Table 3.2 Alexandrian regnal years 270-7

AD	270/1	Claudius Γ	= Quintillus A	= Aurelian A	= Vaballathus Δ
	271/2			B	E
	272/3			Γ	
	273/4			Δ	
	274/5			E	
	275/6			ζ	
	?			Z	= Probus A
	276/7				B

The dates contradict the death of Aurelian in late 275 and the only satisfactory solution is to join together two years which Price does with the beta and gamma marked coins, the confusion over the death of Claudius and the start of Aurelian's reign being put down to the time taken for the official news of the death of Claudius at Sirmium to reach Egypt. Such a compaction is noted in a document from 24 June 272, Oxyrhynchus papyrus 2902. This was compounded by the confusion over the successor, initially being the senate's choice of Quintillus, prior to the circulation of the rumour of the late designation by Claudius of Aurelian as his successor. Indeed, as Aurelian did not consider Quintillus to be the successor to Claudius his regnal years may be calculated from the death of Claudius. This could push the first year of Aurelian to the Alexandrian year equating to 269/70, that is, an accession before September 270 and thus pushing the death of Claudius back to the previous Alexandrian year, coins bearing his third year mark being the result of slow information passage.

Price also cites the evidence of the comparative rarity of year 7 tetradrachms of Aurelian compared to those of Severina, for example in the Karanis hoard, suggesting that this may lend support to the theory of an interregnum period between the reigns of Aurelian

and Tacitus being recognised at Alexandria²³.

The confusion is perhaps exacerbated by the capture of Alexandria from the control of the usurper Vaballathus and Zenobia which probably occurred around late April or early May 272. Prior to this date the mint was not under Aurelian's control and he therefore may not have been able to exert his will to count his dies imperii from the death of Claudius prior to this date. This again would allow for compaction of the year 2 and year 3 coins into the same twelve month period.

After dealing with the official chronology and its anachronisms the chronology of the rival Gallic regime can now be considered.

We know from the coinage that Postumus celebrated five consulships and ten periods as tribune²⁴. The ephemeral Gallic rulers Marius and Laelianus are not recorded with either. Victorinus records his second consulship and his third tribunician power and Tetricus I enumerates three consulships and three periods as tribune. Tetricus II enumerates no consulships specifically on his coins but is associated with his father's third²⁵. All these dates must be fit into the period of the Gallic Empire.

It is probably best to start with the end of the Gallic regime. We know from the epigraphic evidence that the Gallic regime was over and that Aurelian is recognised throughout the area of the revolt before the end of his reign and thus there is a terminus ante quem of 275 AD. Lafaurie lists two such inscriptions of Aurelian from Britain and fifteen from France and Germany²⁶.

The inscriptions from Britain, on milestones from Bitterne and near Carvoran fort along the Stanegate (RIB 2227 and 2309), aren't particularly helpful as they are both undated²⁷. There are, however dated inscriptions from mainland Europe.

As well as the expected concentration of inscriptions from southern France and the Alpine passes others are recorded from as far north as Salzig and as far west as Elven in Brittany.

The Elven inscription (CIL XIII, 8997) records Aurelian's third consulship, which, according to the Prosopography of Jones et al. in their list of the Fasti Consulares, equates to 275 AD²⁸. The inscription from Treteau (west of Autun) in central France (CIL XIII, 8904) enumerates TRP V COS III. This causes a problem as there is an inconsistency in the titles. The tribunician power of Aurelian was renewed on 10th December each year, thus the fifth tribunician period ran from December 272 through to December 273. This is clearly in conflict with Jones' dating.

This is made worse as Lafaurie is able to list inscriptions with the following pairings of titles:

TRP; TRP II; TRP III; TRP COS; TRP II COS; TRP III COS; TRP III COS II; TRP III COS III; TRP III COS III; TRP V COS; TRP V COS II; TRP V COS DES III; TRP V COS III; TRP VI COS III; TRP VI COS II; TRP VII COS II; TRP VII COS III.

There is an apparent back track in the consular titles against the tribunician. I feel that

some of this lends credence to the contraction of the regnal years noted on the Egyptian coinage, noted above, and the confusion that abounds there may be more widespread. As a result Lafaurie fixes his chronology on the tribunician date, placing the combination of TRP V COS III in the period prior to December 273. The epigraphic evidence is thus heading towards a period late 273 to early(?) 275 for the end of the Gallic Empire. It should be noted that Treteau is well south of Châlons-sur-Marne, the location of Tetricus' final defeat, suggesting an earlier date, rather than later. Also it is recorded that the 'epigraphic habit' was in decline, thus embedding uncertainty as to what was expected or required. It is unfortunate that the Salzig inscription (CIL XIII, 9139) is, like the British examples from Aurelian's reign, of uncertain date.

Can the historical written sources help? Up to a point I think that they can. Zosimus is useful in that he makes a passing reference to the coinage reform of the emperor Aurelian:

".....Tetricus and the other insurgents were easily subdued and punished as they deserved. Now he officially issued new money after arranging for the state to buy in the debased coinage to avoid confusion in financial dealings" (Zos. I.61)²⁹

This would indicate that once again the defeat of the Tetrici occurred around 274, prior to the reform of the coinage which occasioned the issue of the XXI and KA marked pieces in billon. Göbl tabulates this reform as taking place in 274, probably early on in the year³⁰. The relatively common products in the name of Aurelian and Severina from the mint of Lyon, displaying the marks (A-D).L. are of a post reform standard, judging

from the analyses published by Cope et. al³¹. The four analyses reported show silver concentrations of between 3.74 and 4.35% (mean 4.14%), in line with the post reform coins from other mints.

There is another issue of coinage which, from the style, must be placed in Gaul. The coins (RIC 4 & 5) are much rarer than the Lyon marked issues and share a portrait style much more akin to the last issues of Tetricus than the post reform products of the Lyon mint (the CONS PRINC AVG type listed as RIC 2 is a product of the Antioch mint). I have no supporting analyses but, I suspect, that these are pre reform issues, made immediately after the Gallic defeat.

Returning to the written sources, the *Historia Augustae* places the defeat of Tetricus after the defeat of Zenobia and records the imperial procession of which they were both part³². Unfortunately this event is not linked to any imperial regnal titulature, again not aiding comparative chronology.

The history written by Aurelius Victor can throw no further light on this chronological problem³³. Indeed it only adds to the confusion by stating in paragraph/chapter 35, the history of Aurelian, that:

"Tetricus.....begged for the protection of Aurelian (and) after two years of exalted power, was led in the triumph (of Aurelian)" (A. Vict. 35)

This does not reconcile with the tribunician titles that are recorded on the coins, which

are three, although it could signify the completed periods of tribunician powers. It also does not sit well with the coins that acknowledge the decennial vows, presumably made on the occasion of Tetricus' quinquennialia.

Further, the history of Aurelius Victor has been demonstrated to have been probably derived from a historical source now lost to us, the so called *Kaiser Geschichte*³⁴. This is based on the observed similarities between Aurelius Victor, Eutropius's *Breviarium* and the *Historia Augustae*. Therefore it is not surprising that these other known sources can offer little help.

Given all the above it is possible to construct the following chronology of Tribunician Potestas for the Gallic usurpers. I cannot substantiate Tetricus' fifth Tribunician from the known coinage record and he appears from the coinage record and literary evidence to have been overthrown before the monetary reform of 274, that is prior to December 274. The gold coin cited by Lafaurie and Elmer as being known from a cast in the *Bibliothèque Nationale* citing TRP V COS III is, I feel, false or misread. It is not accepted by Schulte. By back extrapolation that would place the revolt of Postumus into the period prior to 10th December 260. It also fits in with Besly's chronology, placing the revolt of Laelian to February 269 and the reign of Marius as being from April 269³⁵. He correlates Schulte's work on the gold coinage with his own work on the billon radiates in the Cunetio hoard³⁶.

Table 3.3 Gallic Empire Tribunicia Potestas, dating from 10 December each year³⁷

260	Postumus	TRP I		
260/1		TRP II		
261/2		TRP III		
262/3		TRP IV		
263/4		TRP V		
264/5		TRP VI		
265/6		TRP VII		
266/7		TRP VIII		
267/8		TRP IX		
268/9		TRP X	Victorinus	TRP I
269/70				TRP II
270/1				TRP III
271/2				Tetricus TRP I
272/3				TRP II
273/4				TRP III
				TRP IV

The above scheme also fits with known inscriptional evidence from the beginning of Postumus' reign and the coinage of Saloninus Augustus. It is fairly certain that the initial reaction to the Gallic revolt was the proclamation of Saloninus Augustus and the issue of coins bearing his name. Coinage with Postumus' name does not start being made until after the ultimate defeat of Saloninus. There is only a single coin issue with the title COS, suggesting the first assumed consulship, a gold one with some problems of chronology (see chapter 7). The dated coinage generally starts with the second consulship (261AD in this chronology). Besly (in the Cuneo report) does suggest that there were at least two issues of Postumus prior to the COS II issues, one of which uses a portrait very similar to Gallienus and mis-spelling Postumus' name as POSTIMVS (sic) and using the praenomen CASS LAT.

Drinkwater suggests that Postumus was awarded his first consulship in recognition of his services in the west under Gallienus and/or Saloninus. This would certainly fit in with

the observed titles in the coinage record. Recently a new piece of evidence from southern Germany has come to light which may challenge this idea and show that the consulship may have been assumed at the same time as the title augustus.

An inscription is known from Augsburg which again fits into this schema. This records a victory of Postumus over the Juthungi around the "VIII ET VII KAL MAIAR" and records his first Consulship with a new personality, Honoratianus^{38,39}. The inscription was dedicated on "III IDVS SEMPTEMB" and records Postumus as Consul and Augustus. This would appear to confirm that Postumus was an army commander in campaigning in southern Germany and scored a significant victory around Augsburg either shortly before or soon after being elevated to the rank of Augustus, albeit as a usurper. The inscription certainly shows that he was using the title by mid September.

This would certainly support the chronology of the central emperors above, which places Valerian Senior's capture and the possible emergency proclamation of Saloninus as Augustus to the summer months of 260.

König briefly examines the possible dates that the altar could have been erected, that is, the dates when Postumus held the consulship and through this he comes up with four possible years⁴⁰. This he deduces from the titles enumerated on the coinage, that is the concordance between the tribunician and the consulship titles, along with the inscriptional evidence of paired non imperial Gallic consuls.

From the coin evidence we know the consulship was held by Postumus with the following tribunician years:

Table 3.4 Consulships of Postumus

Year	Tribunician	Consulship
261	TRP II	COS II
262	TRP III	COS III
268	TRP VIII	COS IIII
269	TRP X	COS V

From the inscriptions three pairs of Gallic consuls are known, Dialis et Bassus, Censor II et Lepidus II and Apr(ilus?) et Ruf(inus?) which may be used to fill in the years 263-267. Inscriptional evidence links the future usurper Victorinus with the fourth consulship which leaves Honoratianus, along with the possible first consulships of Censor and Lepidus, as being in the years 260, 261 or 262. Honoratianus is the only known consul so far that could be associated with 269 by mere virtue that if Censor and Lepidus had their second consulship during the reign of Postumus neither could have their first consulship in the last year of his reign. However the dating of the inscription to September precludes it from being set up in 269 as Postumus was killed in the aftermath of the defeat of Laelian in the spring of that year.

In the end König concludes that the altar, and therefore the consulship of Postumus and Honoratianus, was erected in 260, the year of the Gallic revolt.

By acknowledging that the first consulship of Postumus was in 260 we are then forced to ask the question was it, as Drinkwater states in recognition of Postumus' service on the German frontier or was it a self conferred honour? In tackling this question we should be able to say something about the rank or status of Postumus as, historically, the consulship could only be conferred upon a man of equestrian or noble rank. There is a confusion which is coincident with this period and that is that Gallienus made significant changes to the status and ranks within the army and these must be borne in mind.

Keinast is unable to shed any light on Postumus prior to his usurpation giving both the date of his birth and career progress as unknown but suggesting that under Gallienus he was praeses of Germania Inferior and questioning him as being of a senatorial background⁴¹. The title praeses does not necessarily have any bearing upon Postumus' rank by birth. De Blois notes that compared with the mid second century when a noble might be expected to be raised to the consulship relatively soon after becoming praeses during the third century, and long before the time of Gallienus, the path between praeses and consulship became much more crowded⁴². The rapid attainment of a consulship being almost impossible unless an imperial favourite, which does not necessarily exclude Postumus but certainly suggests that if he was praeses at the time of his revolt then he is unlikely to have held the consulship unless as a suffect consul.

An alternative hypothesis regarding the Augsburg inscription has recently been put forward suggesting that the consulship noted on the inscription does not refer to his first but rather to his second consulship from 261AD⁴³. There is ample evidence that enumerations of titles during this period are not necessarily accurate, one only has to

look at the "dated" inscriptions of Aurelian listed above to see that some impossible combinations are listed. Furthermore there is the suggestion that Postumus' first consulship was a suffect consulship before his revolt and that the assumption of the consulship on his accession would be unusual. Moving this pairing of consuls forwards on year does not cause problems with the available space to fit in the other names.

Further changes were taking place around 260 with regard to the military administration and government of provinces. Prior to 260 and accelerated by the policies of Gallienus there was a tendency for the smaller provinces to be governed by Praesides of the equestrian class. The ranks of the equestrian knights were partly made up of the "municipal bourgeoisie from the more Romanised and Hellenised provinces, but they were also frequently viri militares or low-ranking officials who rose to equestrian rank in the course of their career"⁴⁴. This allowing of provincials of lower rank to progress adds support to the suggestion that Postumus was a Romanised Gaul or German who, according to popular practice, had transformed a Roman nomen into a cognomen in order to derive Cassianus from Cassius⁴⁵.

The above ignoble origin of Postumus is further supported by the passage from Eutropius who suggests that:

"Postumus, a man of an extremely insignificant family, assumed the purple in Gaul" (Eutropius Book 9, 9)⁴⁶

We therefore have a beginning and an end to the Gallic Empire along with some suggestion as to the origin and social status of Postumus. It is now proposed to turn to the key events that took place during the period of the usurpations.

Postumus does not seem to have had either the desire (according to Drinkwater) or the opportunity (according to De Blois) to advance on Italy. The former suggesting that the revolt was borne out of a Gallic nationalist movement, the latter using the barbarian raids as a mechanism for committing the troops of Postumus to the Rhine region and thus not being free to advance south without jeopardising Gaul.

Instead Postumus looks to have secured his flank as both Britain and Spain look to have recognised his rule. Whilst it may be dangerous to read too much into coinage designs the use of a galley device on the early issues in gold, silver and copper/bronze along with that of Neptune and the legend NEPTVNO REDVCI on the gold and silver does imply some journey or campaign overseas, to Britain perhaps? However it should be borne in mind that there is no known inscription where Postumus is recorded with the title Britannicus Maximus and so this may be a red herring.

The barbarian raids from across the Rhine did continue and thus De Blois may be correct in his appraisal of the situation. There are two distinct VICT GERMANIA/VICTORIA GERMANIA issues. The first being prior to the second consulship, that is, prior to 261 in the above chronology. The second is coincident with the third consulship and thus dating to 262, possibly going into the following year. The historical sources support this, although the nature of the accounts, being so brief, seem to compress time and give a

false impression of the chronology. A demonstration of this is given below using the text of Aurelius Victor:

"First of all Postumus, who happened to be in charge of the barbarians in Gaul, seized the imperial power. After he had driven off a horde of Germans he was involved in a war with Laelianus whom he routed just as successfully, but then he perished in a revolt of his own men..." (A. Vict. 33)⁴⁷

The nine year reign of Postumus is condensed into but a few lines yet still conveys a certain degree of information. What is missing is the attack of Gallienus in the mid 260's when Postumus was engaged in battle twice, and on both occasions being lucky to survive. Drinkwater asserts that the Gallienic invasion was around 265 based on the nature of the reverse types of his coinage from the mint of Rome. Certainly the lack of victory was at least on one occasion down to the actions of Aureolus and this may have been the cause of his revolt at Milan in late 267 or early 268. It seems that this revolt, creating what was, in effect, a buffer zone between the two rival regimes and probably was the cause of Gallienus not taking further action against Postumus.

Postumus, as we see from Aurelius Victor's account, was troubled by internal strife. First of all there was the revolt of Laelianus which was successfully quashed but Postumus was soon murdered by his own soldiers. The reason for this is also suggested by Victor whose account continues:

"...(Postumus) perished in a revolt of his own men supposedly since he had refused to

allow them, despite their insistence, plunder the inhabitants of Mainz because they had supported Laelianus." (Aur. Vict. 33)⁴⁸

After the brief reign of Marius the Gallic throne was taken by Victorinus who had shared the consulship with Postumus in 268. It is probably around this time that Spain ceded from the Gallic Empire. There is evidence for this in the recorded inscriptions from Spain which are known for only Postumus of the Gallic usurpers and from Claudius II onwards for the Central emperors. While the precise date of this occurrence is not known there may be a correlation between the loss of Spain with its known, but dwindling, mineral reserves, in particular silver, and the significant debasement of the base silver coinage of Postumus that occurred between the fifth and sixth issues dated by Besly and Bland to 268 (that is between, for example, the PAX AVG and ORIENS AVG reverses without and with the P control mark in the field)⁴⁹.

There were two other significant events during the reign of Victorinus. The first of these was the crossing of the Alpine passes by the army of Claudius and the taking of Grenoble. There are milestones from the vicinity which record the third tribunician of Claudius, 270 AD, for example that from Vienne (CIL XII, 5511).

The second event, possibly connected with the above events or maybe the switching of the allegiance of Spain back to the central ruler's control, is the revolt of the Aedui at Autun and the appeal to Claudius for help. This help did not come and the revolt was crushed by the armies of Victorinus.

One may contrast the treatment of the town of Autun at the hands of Victorinus with that of Mainz under Postumus. Autun, it appears, was sacked and left in ruins for some thirty years until being rebuilt by Constantius Chlorus whereas Postumus refused to let his troops sack Mainz after the defeat of the rebel Laelianus, an act that reputedly cost Postumus his life⁵⁰. Victorinus, it seems, had learnt from the mistakes of his predecessor.

The defeat of the rebels at Autun is apparently recorded in the coin types of Victorinus. Traditionally two mints struck the base silver coinage of Victorinus, differentiated for the most part by the depiction of the imperial bust on the obverse. Schulzki (1996) does not differ in his mint attribution from Elmer (1941) nor, for that matter, from Webb's *Roman Imperial Coinage* (1933). The question of the location of the mints will be dealt with in a subsequent chapter but it is appropriate here to note a further differentiation between the two mints. What is regarded as the primary mint is renowned for distinctly military reverses, PAX AVG, FIDES MILITVM, INVICTVS, VIRTVS AVG and so on. The second mint used more social reverses, AEQVITAS AVG, SALVS AVG, PIETAS AVG and PROVIDENTIA AVG. There does appear to be a harmonisation of the types with the fourth issue. VICTORIA AVG is a significant issue from both mints. In addition the usually conservative second mint issues distinctly military supporting reverses such as MARS VICTOR and COMES AVG (Mars standing).

Victorinus was murdered in 271 (Drinkwater suggests early on in the year) and eventually succeeded by Tetricus.

From 273 Tetricus associated himself with his son, also called Tetricus, and began to

issue coins in his name. This was followed by the joint consulship of the two in 274 AD, celebrated on the gold coinage.

There was an improvement in the alloy of the, what was now very, base silver coin known today as the antoninianus. Cope et al (1997) indicate that this improvement was in the order of 0.5-1% at mint 1 and c.0.5% in the penultimate issue of mint 2. This was accompanied by a weight increase of approximately 36% to 3 grammes. Drinkwater suggests that this increase in weight and silver content was to bring the coinage into line with that of Aurelian. This weight increase coincides with the plural reverse legends that occur on the coinage of the Tetrici.

This may be the opportunity to review the evidence that Tetricus II was raised from caesar to augustus shortly before the fall of the Gallic regime.

Central to the argument are the few rare coins which give the junior Tetricus the title of augustus, the obverse legend being IMP C P ES TETRICVS C AVG, an example of which was published by Sutherland (plate XXIX, 1)⁵¹. The coin, the circumstances of its discovery being unknown to me and not disclosed by Sutherland, displays a markedly mature bust of Tetricus junior on the obverse. In the same paper is a double bust antoninianus with the obverse legend IMPP TETRICI PII AVGG, the reverse being SPES PVBLICA and a reverse die duplicate of the previous coin. In support of this there is the text of the *Historia Augustae* which in the biography of Aurelian states:

"In the procession was Tetricus also, arrayed in scarlet cloak, a yellow tunic, and Gallic

trousers, and with him his son, whom he had proclaimed in Gaul as emperor." (Hist. Aug.; Aurelian 34)⁵²

Neither Aurelius Victor or Eutropius acknowledge this promotion^{53,54}. There are other problems to his promotion. One such is the radiate published by Sutherland and noted above. The coin, which is in the Ashmolean Museum, displays certain features which do not convince one of its authenticity and these are noted below.

The obverse legend of the coin, which terminates ...C AVG, is a form not known for the period. Indeed, one might almost see it as CAES that has been misread by the die cutter, official or otherwise, or it could, with some skill, be tooled at a later date to form the appropriate letters.

There is a problem with the reverse. While SPES PVBLICA is a known reverse for both Tetricus I and II neither placed any workshop, mint or any other form of control letters on them. The above two coins which seem to imply that Tetricus II was made up to the rank of augustus have the letter P in the exergue. It may be purely a coincidence but the Milan Mint issue of SPES PVBLICA of Claudius II have the officina mark P in the exergue. The above problems are sufficient to dismiss this coin as being an irregular issue of either ancient or more modern manufacture.

Some time in 274 Tetricus surrendered to Aurelian after a battle at Châlons-sur-Marne to the east of Paris. The location of the battle is noted by Aurelius Victor, Eutropius and the *Historia Augustae*. They all agree that Tetricus made some pact with Aurelian before

the battle in order to secure favourable terms upon surrender. This brings me back to the plural reverses on the late issue of base silver coins of Tetricus. There is the possibility that the second G in AVGG refers not to the young Tetricus caesar just as Philip I had issued for his son in the mid 240's prior to the younger Philip's elevation to augustus. But rather it could have been an attempt to secure an alliance with Aurelian by acknowledging him as a colleague rather than as a rival, something similar being done by Carausius at the end of the century when attempting to secure a peace with Diocletian and Maximianus.

From the known titles on the coins the latest issues of Tetricus I are of the fourth tribunician which according to the above chronology are to be place between 10th December 273 and 9th December 274.

The chronology of the period is now sufficiently established to move on to the examination of some of the material remains of the Gallic Empire beginning with a summary of the extant epigraphic sources.

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CHAPTER 4 - EPIGRAPHY

The epigraphic evidence for the Gallic Empire is, as one may expect, rather scattered. While *Damnatio Memoriae* is not recorded in the texts of the *Historia Augustae*, Eutropius or Aurelius Victor one may be certain that with the reintroduction of central control that traces of the Gallic regime would be erased, at least from public buildings and monuments wherever possible. Once these inscriptions have been removed or erased there is the possibility of reuse of the stone and so the find spots may not accurately reflect the original location or use. Thus the existing examples of Gallic inscriptions may be somewhat distorted in terms of their find spots and care should therefore be taken with any such interpretations.

There are three accessible modern listings of inscriptions from the western provinces during the Gallic revolt and these are, in date order of publication, by Lafaurie, König and Drinkwater^{1,2,3}. These publications are not exhaustive but very little in the way of new inscriptional material has been published since Drinkwater.

There is a problem in trying to assemble a complete list of Gallic Empire inscriptions, along with Central Empire colleagues of the period and that is that there differences in what each of the accept as being authentic attributable inscriptions. An example of this is the inscription purportedly of Claudius II from Britain. The inscription, König number 63, is given as:

Imp[(eratori) C(aesari) M(arco)] Aur(elio) V[(alerio)] Cl[audio p(io) f(elici) inv(icto)
Aug(usto)....

Reference to the illustration reproduced in RIB (2246) shows this to be a very optimistic reading as only IMP and AVR may be clearly defined⁴. There may be the suggestion of CL under AVR but this is by no means clear. There are a number of emperors, particularly during the third century, who used Aurelianus or Aurelius as part of their name. Claudius is recorded in no other place as having control over Britain and given that there are inscriptions of later Gallic usurpers the whole length of Britain must cast further doubt on this attribution.

Figures 4.1 to 4.6 show the distribution of inscriptions by emperor, from both the Gallic and Central lines. A concordance of my numbers along with König and Drinkwater is reproduced in appendix 1 at the end of this work, along with any dating information.

As already recognised the distributions are open to the significant possibility of being skewed, that is, the non appearance of imperial names in any particular area should not be taken as an indication of the lack of control. The Gallic emperors monuments that are extant do show signs of alteration and erasure.

Examples of this include the inscription from Lancaster which not only has the name Postumus partially erased but also the epithet of the military unit, the *alae Sebussianae Postumianae* (RIB 605).

Similarly the recent inscription from Augsburg citing a victory of Postumus over the Juthungi and associating him as consul with Honoratianus has suffered from name erasures⁵. Not only have the names of Postumus and Honoratianus been erased but also the name of the person who set up the monument, Marcus Simplicinius Genialis. There is also evidence that the memorial was not new when erected in the 260's as there are traces of an earlier inscription, possibly to Severus Alexander, demonstrating that there was reuse and replacement of inscriptions. Thus those that survive are probably only a fraction of what originally existed.

Besides recarving and name erasures other inscriptions have been removed and reused in other ways. An example of this may be found at Rockbourne Villa in Hampshire. There two inscriptional stones, one naming Tetricus II and the other Trajan Decius were reused in the foundations of the north wall of room XIV to the west of the site⁶.

Examination of the plots of find locations of the inscriptions in stone from this period demonstrates well the incomplete nature of this record. Contrast if you will the surviving inscriptions of the Tetrici from France with those of Aurelian. The Aurelian inscriptions form a line running up through France whilst those of Tetricus flank them on either side. If one were to look at this distribution one might surmise that the army of Aurelian cut a swathe through that of Tetricus, dividing his army and support in two, breaking the spirit of the Gauls. This is not the case. A number of the Aurelian inscriptions are dateable with consulship and tribunician titles and are all probably post capitulation. It is very clear though that where Aurelian inscriptions exist, Tetrican ones are absent.

With regard to the dating of the inscriptions there are some discrepancies between consulship and tribunician titles, not just for Aurelian examined in chapter 3 above but also for some of the other key figures.

Postumus is recorded with TRP COS III and TRP COS IIII, time when the third and ninth tribunicians should have been accorded him. Claudius II is acknowledged with TRP COS, TRP COS II, TRP II COS, TRP III COS II, an array of titles that are confused as are Aurelian's⁷. Whilst it is possible to attest some of the confusion during the reign of Aurelian to a recalibration of titles along with the Alexandrian regnal years following the defeat of Zenobia this cannot be used to explain what is happening during other reigns.

I believe the confusion over the regnal titles is due to unfamiliarity with the form and possibly the local nature of some inscriptions. It has been said before that during the third century the "epigraphic habit" was diminishing. After 260 there is a sharp decline in the number of inscriptions recorded from Gallia Belgica⁸. Furthermore the inclusion of regnal titles allowing dates to be ascribed to inscriptions are not regarded as being commonplace on Gallic monuments in the first place and those that are present should only be regarded as approximate⁹.

Thus the dating evidence and the titular anomalies from the mid third century is a recognised phenomena from earlier periods in the area of concern. The regnal years that appear on the coins of the Gallic emperors are rarely, if ever, blundered in the same manner as the stone inscriptions and thus perhaps signify a differentiation in their official

status. The coins were sanctioned under imperial control whilst many of the extant inscriptions were more local affairs.

Wightman offers more general evidence on the uneven distribution of inscriptions in Gallia Belgica with factors such as the material that the monument was made out of coming into play. For example areas with inscriptions predominantly of sandstone are not going to be used in the production of quicklime, unlike limestone when one would make use of extant materials before quarrying new¹⁰. Similarly because many of the monuments are not found in situ but rather as collapsed inscriptions or even more likely as blocks reused in foundations then these will be found where excavation has been greatest, Trier and Cologne for example. Examination of the maps appended show there to be a cluster of monuments from these areas. These are also the areas where the Gallic Empire had its power base, the Rhine legions, so there would be probably be more inscriptions in that area created so that the chances of some surviving are greater.

All this demonstrates that we are dealing with an unknown population, the original distribution of which is also unknown. There is no way of telling what proportion of the inscriptional evidence survives from the fifteen years of the Gallic Empire, nor what the original distribution was. That there was some action by the central Roman authority to erase from monuments the names of the Gallic usurpers is clear and therefore the distributions would probably look different if the full record of inscriptions was known.

What is possible, I feel, is that the distribution of the Central Empire inscriptions can support the narrative of the Gallic Empire as the inscriptions of Claudius II in particular,

a significantly honoured and posthumously revered emperor, would not necessarily be subjected to erasure by successive rulers.

The occurrence of several inscriptions in Spain of Claudius, combined with the lack of unproblematic sole reign inscriptions of Gallienus and Gallic inscriptions from the reign of Victorinus onwards show that large areas supported the central regime. The majority of them though are located along the southern and south east coast and this may lend weight to a division of support in Spain. Of the three inscriptions recorded for Postumus two are from the northern coast of Spain and date to his third and fourth consulships (262 and 268 respectively). Three inscriptions are not much to go on but there have been suggestions of a divided Spain and although the final take over was not so much an invasion as a switch of allegiance during the reign of Claudius II there was still some support for Postumus late on in his reign^{11,12}.

I refer to "unproblematic" sole reign inscriptions of Gallienus from Spain for there was recently published an inscription from Merida, central Spain, which bears somewhat confusing titles¹³. As occurs on some inscriptions of Aurelian from France the consular and tribunician titles are out of step. The monument records the 10th tribunician and the 3rd consulship, intimating dates of 10 December 261- 9 December 262 and January 257 - December 260 respectively¹⁴. As Postumus was proclaimed emperor in the summer of 260 in Germany and France this has implications for the completeness of Gallic rule in Spain and may imply that it was not universal.

The inscription is reproduced in full as:

Imp(eratori) Caes(ari) Publico [Licinio Egnatio Gallieno Pio Felici Aug(usto)] pontifici
maximo Daci(co) maximo Germ(anico) max(imo) tr(ibunicia) pot(estate) X co(n)s(uli)
III imp(eratori) III pro(con)s(uli) p(atri) p(atriciae) P. Clodius Laetus Macrinus u(ir)
c(larissimus) leg(atus) eor(um) pr(o) pr(aetore) deuotus [n]umini maiestatique eius

The apparent damage to the inscription, erasing the larger part of Gallienus' name may indicate the overcoming of resistance to the rule of Postumus and the *Damnatio Memoriae* of Gallienus.

It is striking that the inscriptional evidence for Claudius II in Spain coincides with a number of hoards from the same area with terminal coin dates c.265-7 and which also have very few coins of Postumus proportionally¹⁵. These hoards also contain significant numbers of eastern coins.

The other area where the inscriptional evidence has been used is in the support of Drinkwater's narrative of the events in southern France where there is a cluster of inscriptions from Briançonnet to Vienne on the outskirts of Lyon¹⁶. These bear the 'dates' TRP (late 268?) through to TRP III (late 269 to mid 270) and are used by Drinkwater to propose a campaign into this region otherwise unrecorded in history. This makes sense and it is not hard to imagine that the new emperor Claudius, having defeated the besieged Aureolus at Milan who was striking coins in the name of Postumus, to secure the mountain passes across the Alps into Italy. The dates of the

inscriptions can be misleading but if one assumes that there is no enumeration following the TRP recorded on the inscription from Briançonnet (which also does not record the title Gothicus Maximus, unlike the two inscriptions dated TRP III from St. Didier de Charpey and Vienne, thus suggesting that it pre-dates that campaign) then he had support in this region from the early part of his reign. Thus his flank was secure and he could then move against the Goths without fear of a surprise attack from the rear or invasion from Gaul into Italy. This I feel would be important as although Postumus's actions may have been understood by Gallienus there were now two new rulers in the Gallic and Central Empires whose tactics were potentially different to their predecessors.

The name and rank of the commander left in place by Claudius to protect the Alpine passes and Narbonensis from the Gallic regime is recorded on an inscription from Grenoble (my list Claudius 2, König 72, CIL XII 2228). A Julius Placidianus, praetorian prefect, is named during the second tribunician of Claudius and may indeed be the same Julius Placidianus who shared the consulship with the future emperor Tacitus in 273AD¹⁷. Reference is also made in the inscription to the soldiers under his command which comprised of vexillations and cavalry and thus may have been a significant force.

One may believe that the loyalties to the Central Empire and Claudius II extended right the way along the southern coast of Europe given the known distribution of inscriptions to him and contrasting this with the extant inscriptions to Victorinus whose inscriptions are restricted to Britain, Rhineland and northern France (if one ignores the dubious attribution of an inscription to him from Tarraco) and that the Gallic Empire was being compressed. If one surveys the inscriptions of the Tetrici this is not the case. There is

a clutch of three inscriptions from southern France which separate the Claudius II inscriptions from France from Spain. Whether this is evidence of a resurgence of the Gallic rulers to take back territory lost to them under Victorinus or the extant inscriptions of Victorinus give a misleading picture of the area under his control is unclear. Two of the inscriptions bear the name of Tetricus II, the one from Béziers associating him with his father's second tribunician power, 271/2 AD, and may thus demonstrate his proclamation as caesar was earlier than the accepted 273. Alternatively it could be a mason's error and TRP III be the correct date. Given the quirks noted on the inscriptions of Aurelian in particular the latter cannot be ruled out.

The above summarises the distribution of the inscriptional evidence but what of the content? Do the inscriptions add anything to our knowledge of the Gallic Empire?

In short the answer must be yes for our knowledge of the 'non imperial' consulships is entirely based upon the inscriptional evidence. The above chapter on the chronology is heavily reliable upon the consular structure of Postumus as a basis for the latter reigns. It is through the inscriptions of the first Gallic emperor that we can add to the officials of the rebel regime the name of non imperial high officials.

From this body of evidence we know of the consuls Honoratianus (Consul 260?), Censor and Lepidus again (eg König 54 & 55, 26?AD), Dialis and Basus (König 56, 26?AD), Apr(ilis?) and Ruf(inus?) (König 57, 26?AD), Postumus' joint fourth consulship with Victorinus (König 58, 26?AD) and finally the joint consulship of Victorinus and Sanctus (König 77, 26?AD)^{18,19}. These additional important characters recorded on the

stone monuments are almost sufficient, if one allows for the fact that Censor and Lepidus each must have held the consulship previously under the Gallic rule of Postumus to fill in the space in the title when it was not held by the emperor. The only problem is we do not know in what chronological order they served.

The consulships of the Gallic emperors are thus:

Table 4.1 Gallic Empire Consulships

DATE	CONSULS	
260	POSTUMUS	HONORATIANUS
261	POSTUMUS II	
262	POSTUMUS III	
263		
264		
265		
266		
267	POSTUMUS IV	VICTORINUS
268	POSTUMUS V	
269	VICTORINUS II	SANCTUS
270	VICTORINUS III	
271	TETRICUS	
272	TETRICUS II	
273	TETRICUS III	TETRICUS JUNIOR

There are four years when no consul can be ascribed with any certainty, yet we know of three pairs of consuls to fill the gap. The names are there is simply a matter of getting them in the right order. Furthermore, because Censor and Lepidus are consul for the

second time they must have held the consulship before. There are only two possibilities to fit them into this scheme, they are the "missing" pair of consuls from the period 263-6 or each partnered Postumus in 261 and 262.

The above works if Postumus has not held a consulship, that is, a suffect consulship rather than fasti consulship, before creating the Gallic Empire. He was probably of high enough status in the army to have held such an office. However one must bear in mind this is by no means certain and the fact that his actual rank before the usurpation is not recorded then this may be in doubt²⁰.

In respect of the names of the Gallic officials that are recorded two names from the history of this period are absent from the epigraphy. The names of Laelianus and Marius only survive contemporaneously on the coinage. This is perhaps not surprising as both of their reigns were brief and little of any substance could be achieved within the approximate one month and three month period of their reigns respectively. It also serves, I believe, to say something of their status within the hierarchy. That we know of Honoratianus and the other consuls from the surviving inscriptional record must be indicative of how they were perceived by the Gallic rulers. Laelianus and Marius are external to this.

One other piece of evidence regarding the Gallic Empire structure may be gleaned from the inscriptional record and that is the status of Trier and, possibly, infer its pre-eminence over Cologne, particularly important when considering the mint location. This hinges around two inscriptions. The first of these is from a mosaic from a domestic building and

names Victorinus as being a tribune in the Praetorian Guard (Victorinus 9 on my list, König 75, CIL XIII 3679). The inscription is undated but shows the connection between Victorinus and the Gallic throne, which, if the Praetorians were located at Trier then it is likely that the Gallic capital was also there and not at Cologne. The location of the primary mint would also probably be located with the imperial court.

The second inscription, found in Rome, records the career of a man of equestrian rank of procurator of the mint at Trier (CIL VI 1641, König 137). The inscription is believed to be third century in date and must either date from the period of the Gallic Empire or from 295 AD when the mint was re-established with personnel from Lyon^{21,22}.

In conclusion the inscriptional evidence for this period is scattered and has problems if one tries to over interpret it. What one can say is that at least part, if not all of Spain and south east France recognised the rule of Claudius II, encroaching into the Gallic Empire. The inscriptions of Aurelian running up through France cannot be securely dated to a campaign against Tetricus and at least some of the southern coast of France remained under Gallic control until the acknowledgement of Tetricus II, a year or so before the fall of the alternative empire, demonstrating a continuing support for the usurpers away from their 'core' area in northern Gaul.

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Figure 4.1 Inscriptions of Gallienus

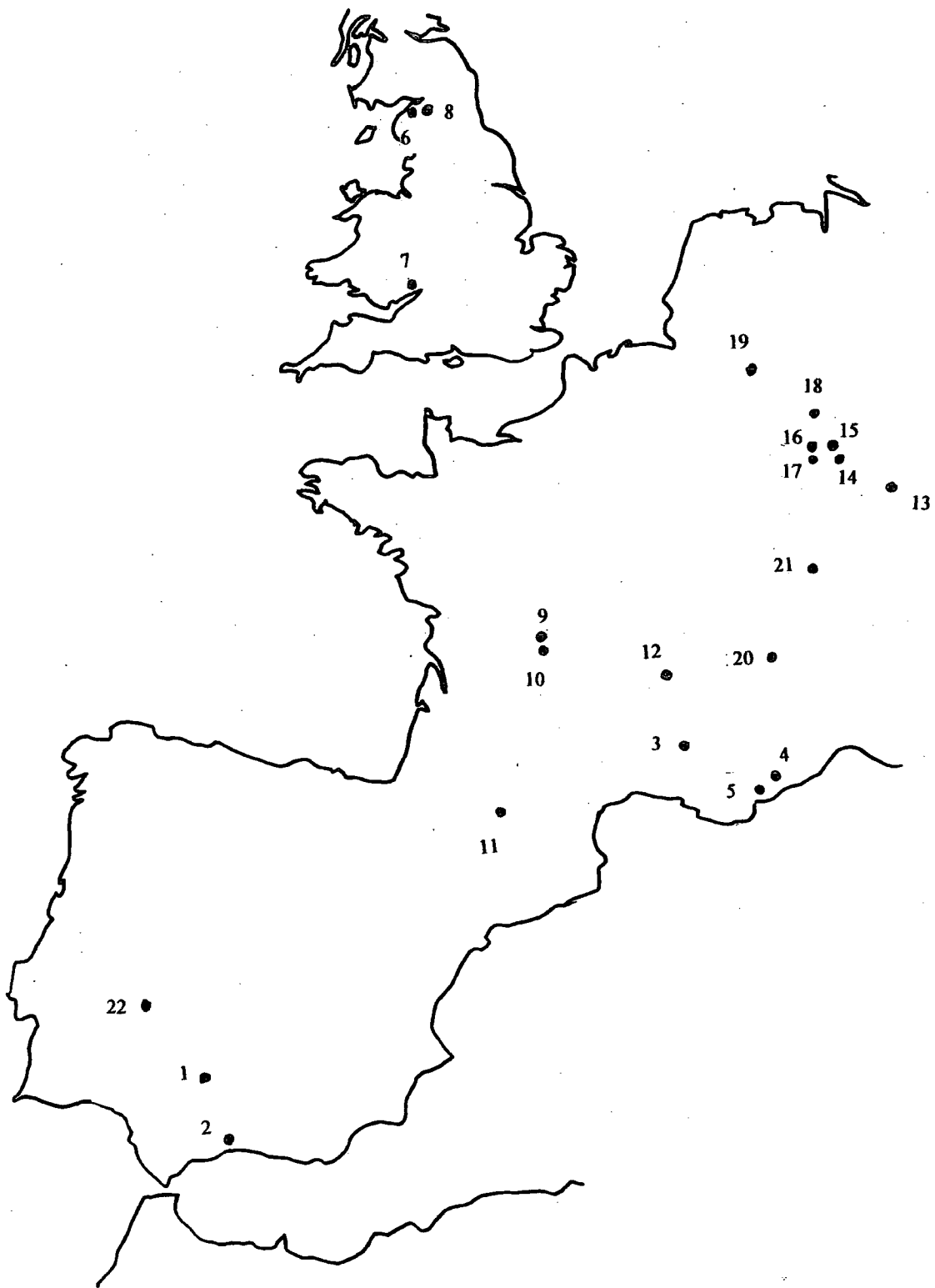


Figure 4.2 Inscriptions
of Claudius II

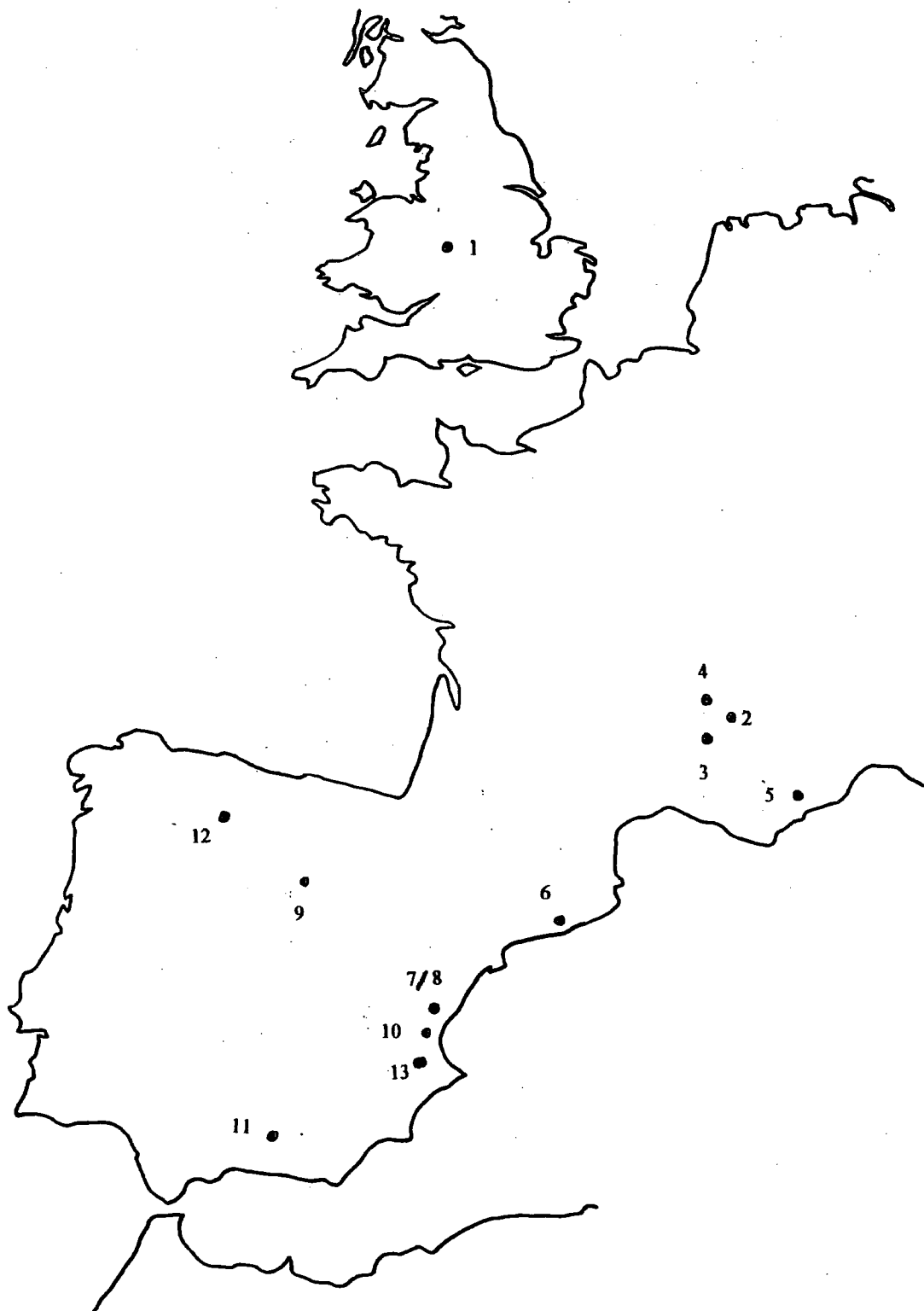


Figure 4.3 Inscriptions
of Aurelian

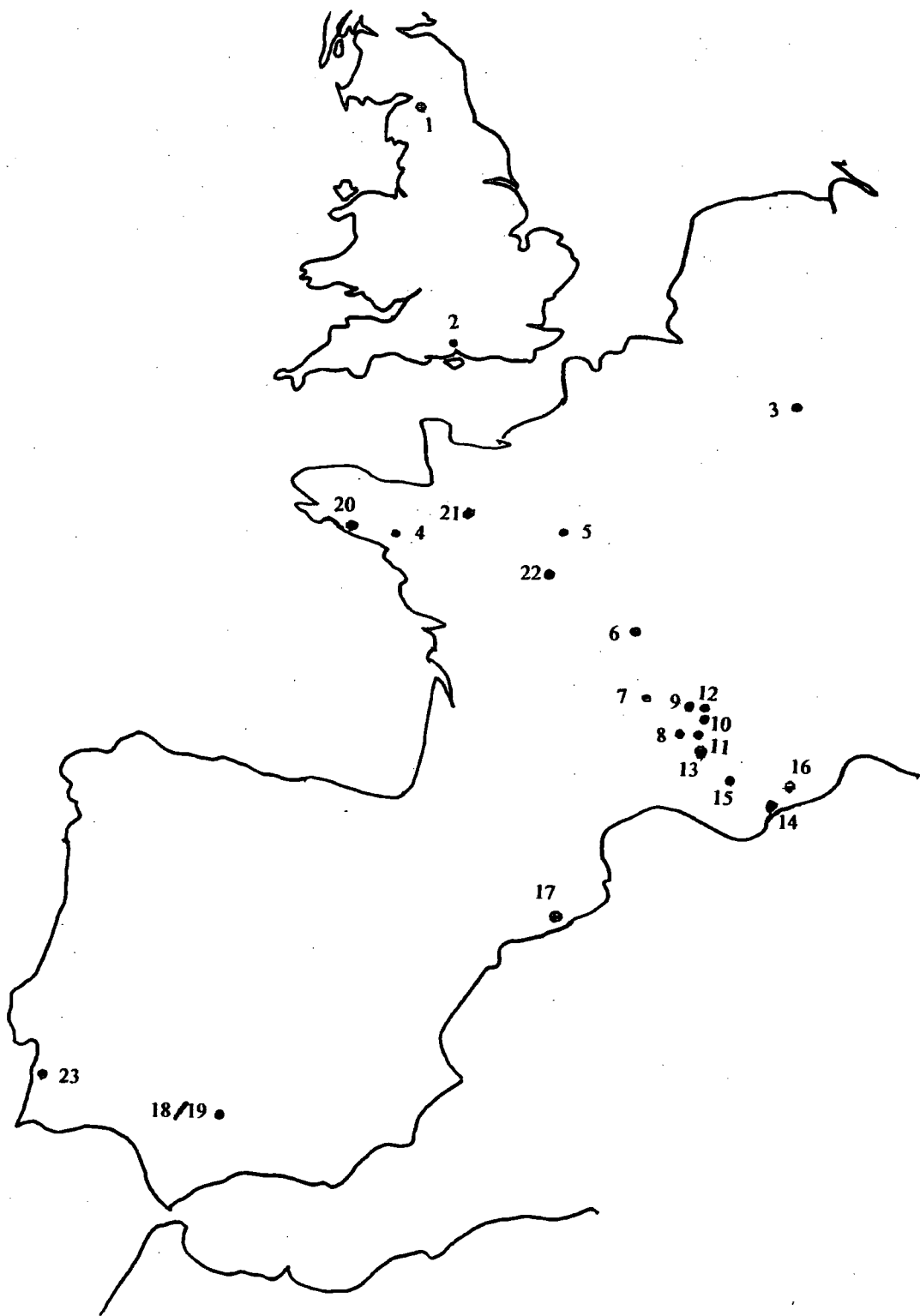


Figure 4.4 Inscriptions
of Postumus

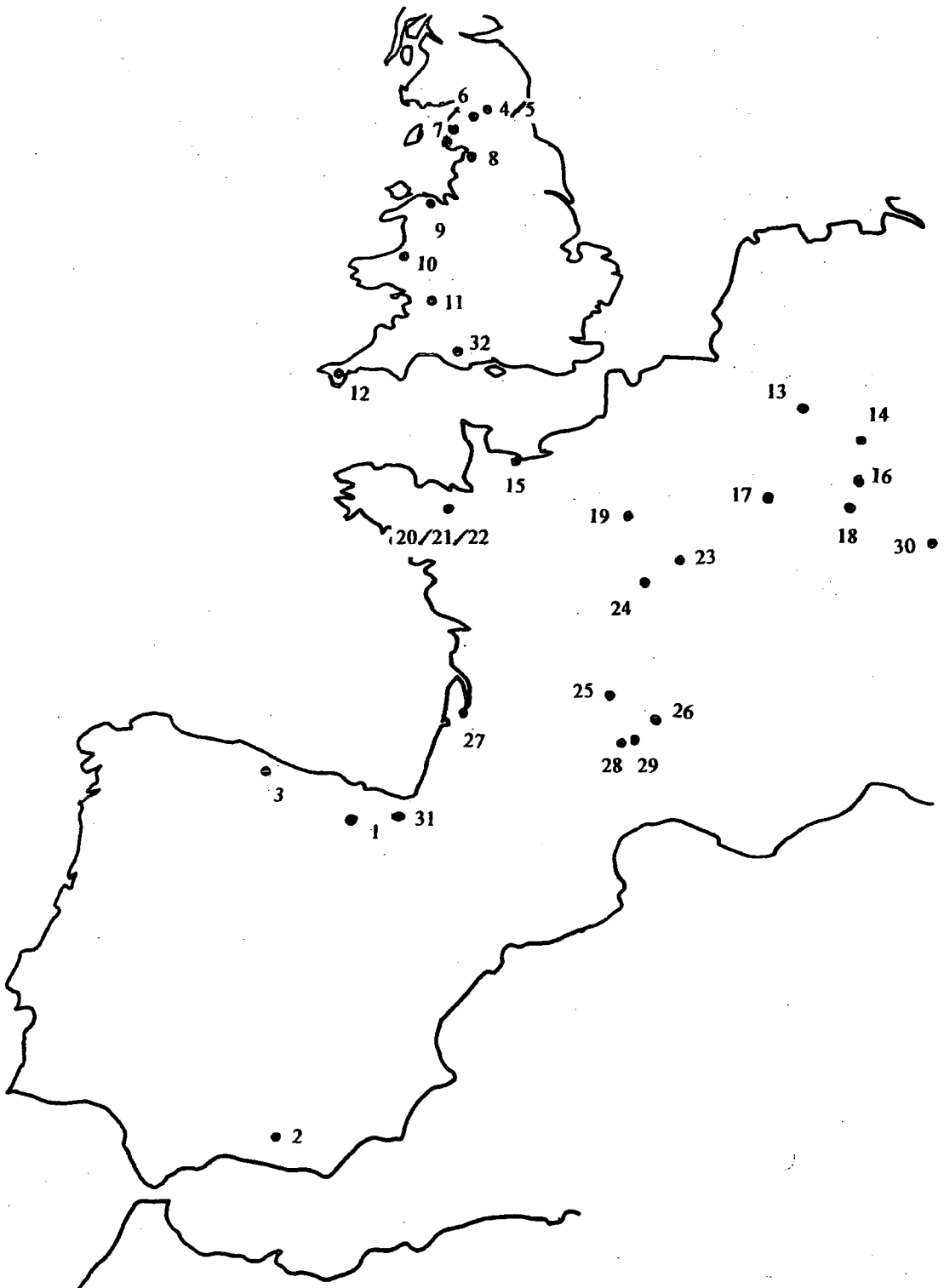


Figure 4.5 Inscriptions
of Victorinus

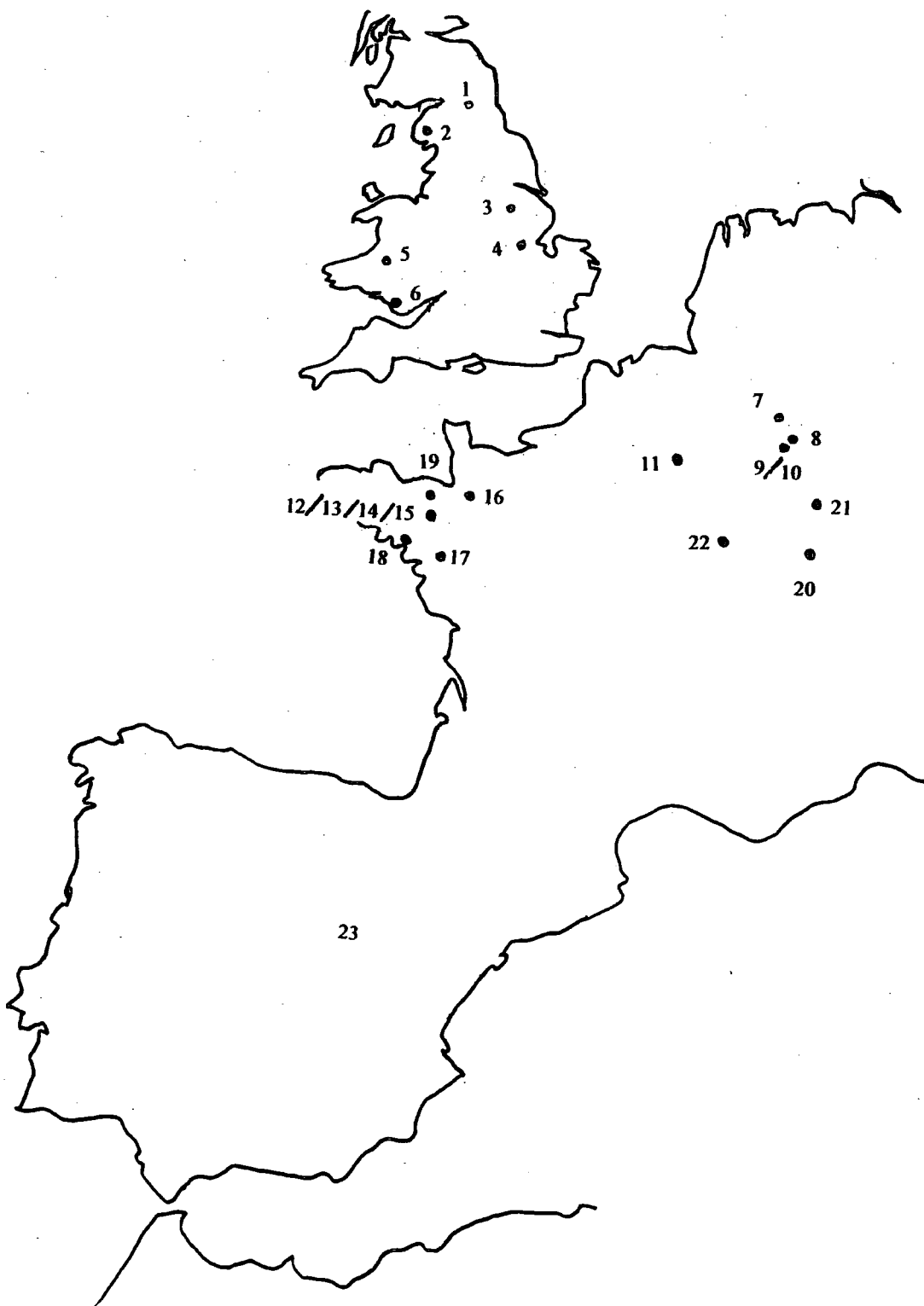
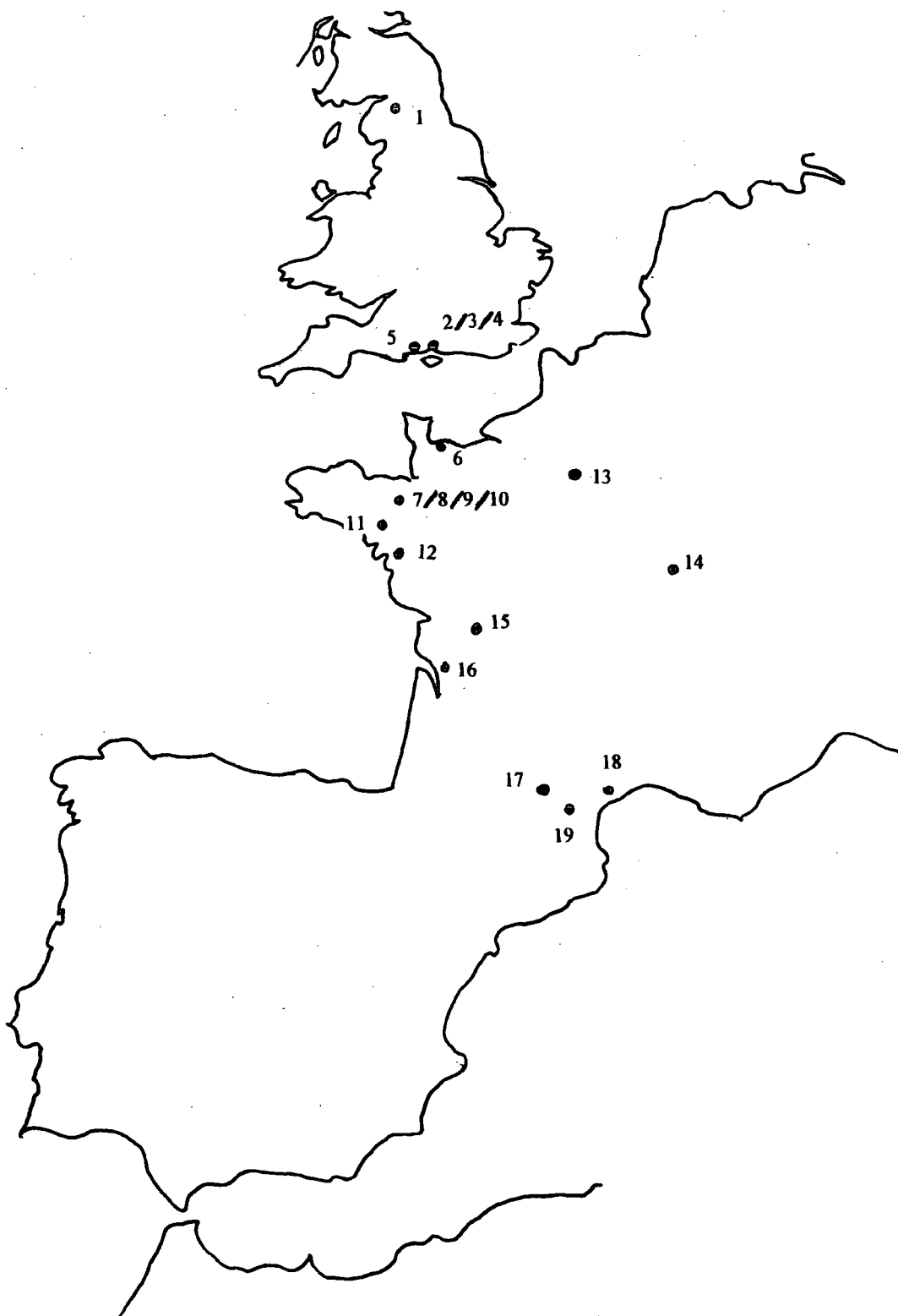


Figure 4.6 Inscriptions
of Tetricus I/II



CHAPTER 5 - GALLIC MINTS

As noted in previous chapter the third century saw the proliferation of mints which struck coins to a similar pattern as the mint of Rome. An indication of the scale of this development may be gained by comparing the numbers that were striking coins for Septimius Severus at the beginning of the period with those striking coins for the joint emperors Diocletian and Maximianus prior to the monetary reform of the mid 290's. The results are tabulated below:

Table 5.1 3rd century expansion of the Roman mints

Emperor	Septimius Severus	Valerian & Gallienus	Aurelian (post reform)	Diocletian & Maximianus
Approx. Date	200	255	274	290
Mints issuing coins of a "Roman" pattern	2	5	9	9

This increase in mint locations was not the only change in the minting during the progression of the third century. The demand for increasingly large volumes of coinage, a process of the devaluation of the currency, due in no small part to the debasement of the silver coinage during the period, caused an increase in the number of mint workshops that were producing coins.

Although it is somewhat still a matter of debate there is a suggestion that during the reign of Gordian III (238-44) or Philip I (244-49) the number of workshops increased

at the mint of Rome from three to six. Six workshops are enumerated on the sixth issue, the "animal series", of Philip and his family^{1,2}.

For further evidence of this one may turn to the sole reign coinage of Gallienus of the Rome mint. In the arrangement of the coinage currently accepted (for example see the Cunetio publication) the enumerated workshops increase from six to twelve between the fourth and fifth issues³. Some writers assert that there was an intermediate nine workshop arrangement but this is by no means certain⁴.

Göbl, for example, splits the fifth issue of Gallienus' sole reign from the mint of Rome into two distinct issues, his 15th and 16th Emission⁵. The first of these is marked A to N (ie 1 to 9) whilst the second is marked Δ to XII (in other words 4 to 12). The differentiation is based upon the appearance of an additional obverse legend, for along side GALLIENVVS AVG the longer IMP CAES GALLIENVVS AVG is used. There is also an alteration in the reverse types used.

This idea is not currently accepted, based on the work of Dolley and O'Donovan⁶. In their study of the 1961 Beachy Head hoard they test the assumption that the outputs from the workshops would be relatively even from any given issue at a mint. They suggest that the two issues are to be combined into a single issue, evening out the distribution of coins for workshops 1 to 9. Workshops 10-12 have fewer coins ascribed to them in the hoard and this is explained by them coming into production at a slightly later date. They thus accept the intermediate step of nine officinae but do not separate the working in twelve as a separate issue. The theory supposes that the output of

individual workshops during any given period should be the same as any other. There is, unfortunately, no way of testing this unless mint accounts come to light showing the distribution of specie between the workshops.

The location of the developing mints is, I feel, in no small way significantly influenced by the location of the current military campaigns. For example the establishment of the mint at Milan by Valerian and Gallienus in the mid 250's must be wholly due to the presence of Gallienus and Valerian II engaged in the campaign against the Franks and Alamanni. This may be witnessed by the opening of a Gallic mint.

5.1 The Location of the Gallic Mints

The location of the Gallic mint has caused numismatists problems, due in no small part to the failure of the Romans to tangibly mark the coins produced in this period with a mint name. It is not until the post reform coinage of Aurelian that the mint initial, L for Lugdunum (Lyon), appears on the coins.

Lugdunum was also the location of a mint during the first century AD and this was seen by some as being logic enough for placing the new Gallic mint there, as if the new establishment was simply reopening the old one that had temporarily closed, albeit some one hundred and fifty years previously⁷. This, unfortunately, is the view taken by the relevant volumes of the widely cited catalogue Roman Imperial Coinage⁸.

I think, given my previous arguments about mint location and the reasons for

establishing provincial mints to be unlikely. The mint should be located with some proximity to the military activity and the imperial base.

To this end Elmer suggests that the Gallic mint should be sited at Colonia Claudia Agrippina Augusta (Cologne)⁹. That this is done can be understood on the basis of the historical record and that the name of the city appears on a rare series of coins from the reign of Postumus. The coins with the name of the city are from late in the reign of that usurper, this is agreed by the currently cited standard references (eg RIC, Elmer, Cunetio, Schulzki).

The historical record notes that Postumus besieged Saloninus at Cologne and there is a late issue of coins naming Saloninus as Augustus. It is therefore assumed that the siege of Saloninus and the minting of the rare Saloninus Augustus coins took place at the same location.

This is, I suspect, not necessarily the case and I tend to follow Besly, Drinkwater and Schulzki with assigning the first Gallic mint to another location, that of Treveri (Trier)^{10,11,12}. This is not done without consideration and the reasons for wanting to ascribe the primary mint location to Trier are set out in Drinkwater and also with the inscriptional evidence in mind from the previous chapter relating to the house of the Praetorian tribune Victorinus and the procurator of the Trier mint.

For example, Drinkwater explains the coinage of Saloninus with the title of Augustus as being a siege issue from Cologne, in line with the written histories but made with coin

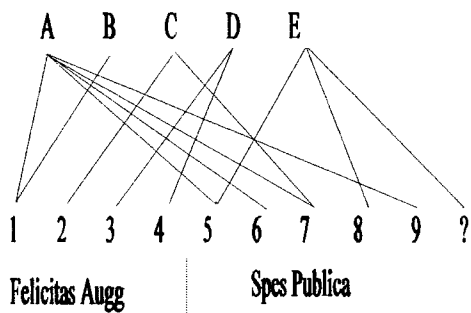
dies transported from Trier. An alternative hypothesis which is not considered by Drinkwater is that the coin issue could have been made while Saloninus was still in residence at Trier and before his flight to Cologne. That is, it could be from the period between the initial proclamation of Postumus in southern Germany and his move north. There are still over thirty silver and one gold coin known and Bland suspects more are going unrecognised in collections^{13,14}. There has been a sudden jump in the number of recorded specimens of the antoninianus of Saloninus from the fifteen recorded specimens listed by Shiel some nine years previously¹⁵. This suggests to me that there was a significant issue in silver of these "Augustus" coins for the following reasons.

Gilljam, in his discussion of the debased silver coins of the later usurper Laelian, is able to record 210 examples of this coinage¹⁶. As noted above the revolt of Laelian lasted about one month. There was a significant debasement in the Gallic coinage around 268 so that the radiate coins contained approximately 1/4 to 1/5th the amount of silver than in 260¹⁷. Thus, pro rata, the extant coinage of Saloninus as Augustus is the remnant of a significant issue, possibly in a similar proportion in real terms as that of Laelian. It is far from being a siege issue, further confirmed by its excellent style compared to the usual products of the Gallic mint from the period.

Shiel has also tried to identify the die links in the coinage of Saloninus as Augustus¹⁸. Of the fifteen silver coins he traced there was a significant amount of linkage amongst them. The fifteen coins had at least five obverse dies and nine reverse dies (one of the fifteen recorded examples could no longer be traced and one had too poor a reverse to securely identify the die).

These links may be represented thus:

Table 5.2 Die linkage in the radiate coinage of Saloninus Augustus



The amount of die linkage between the two known reverse designs of base silver radiates suggests that the two types are being produced concurrently. The choice of reverse type is also significant and must be regarded as propagandist, Saloninus being saluted as the "hope of the people" and the "joyous rule of the emperors" in the period after the initial moves of Postumus against Gallienus' son. They are not overtly militaristic as one would expect if the situation was desperate.

The reasons given by Drinkwater in favour of Trier centre around the location of the Gallic administration of Gallienus and, later, Saloninus. Trier is favoured as the centre for the Gallic campaign of Gallienus as it was a major city located in the vicinity of the greatest attacks by the Franks to the north and the Alamanni to the south and yet being

situated far enough away from the border with free Germany to offer some protection and security for the imperial family.

Further evidence of minting activity being centred around Trier is given in the form of inscriptional evidence with the title of Procurator Monetae Treviricae being appended to an individual of unknown name who eventually became a praeses of Upper Germany. Tradition has it that this was coincident with the Gallic regime although this is by no means certain and may, in fact, be from a later period when the Trier mint was in operation for sure.

Drinkwater also uses an argument for the mint being located at Trier which he uses to dismiss the mint being situated at Lyon. To be fair he does acknowledge this. The argument settles around Roman administrative inertia. On the one hand it is argued that just because Lyon was the location of a first and second century mint does not necessarily make it the obvious candidate for the reopened Gallic mint in the third. Yet further on the same inertia principle is used to back track from the late third and fourth century mint to suggest the establishment earlier on!

The conclusion is reached that the initial mint was located at Trier with a subsidiary mint opening at Cologne coincident with the reverse types of Postumus that specifically name Cologne on the reverse.

This is now complicated by two coin types identified by Besly and Bland as not fitting into the main silver series¹⁹. They established, through a die study of the Cunetio hoard,

that there was a distinct differentiation between the coins of Postumus from the primary mint in terms of the observed die links. Obverse die links were noted between certain reverses and yet were missing from particular groups of coins from the same period. Through this they postulated a two officina system of minting.

Around the time of their third series which incorporated the PM TRP IIII COS III PP reverse, or possibly slightly before, they notice a new series of coins, the MONETA AVG, that do not share any dies with either their "officina A" or "officina B" types. The later SAECVLI FELICITAS type also follows suit. From this they suggest that either a new workshop has come on stream or that it a totally new mint that has been established. Drinkwater suggests that this is a new mint, travelling with the army, established to meet the increasing demands of campaigning.

The idea is seductive, Moneta was used as a reverse design upon the establishment of the Cologne mint a few years later. One must be very cautious about over interpreting the reverse design of Roman coins and recreating history from them.

A further argument against these coins being the product of a separate mint, or at least a separate die cutting establishment, is provided by a rare series of coins which show epigraphic errors on the reverse. A number of these are published by Gricourt and Hollard which are described below²⁰. Two types of error are recorded and each looks as if it was caused by the die cutter forgetting the reverse legend he was cutting in the light of the reverse design. The first of these reads *MONETAS* AVG (my italics to demonstrate the additional letter), while the other is *MONETIA* AVG. One does not

have to look far for the types which were causing the confusion, namely the FELICITAS AVG and PROVIDENTIA AVG types which are ascribed by Besly and Bland to their third issue from the main mint. As Gricourt and Hollard point out the confusion with the Felicitas type is, in some way, explainable as both the standing figure of Moneta and Felicitas are depicted standing left holding a cornucopia in their left hand. What caused the confusion between Moneta and Providentia is not so obvious. It also suggests that the legends were added after the cutting of the reverse design on the coin dies, possibly by a different engraver.

Furthermore, the same paper also publishes obverse die links between the MONETA AVG coins and two reverses from Besly and Bland's second issue. The reverses of the linked coins are NEPTVNO REDVCI and PM TRP COS III PP.

One could conclude that this is evidence for the Moneta coins to be struck at the same location as the main issues of coins from this part of the reign but I do not think that this has to be the case.

I record above that there were no "cross officina" die links noted by Besly and Bland, although they go to some lengths to describe the similarities of portrait style in order to suggest a central location for die cutting and that two distinct styles were cut. Dies of either style could be found at all three officina (the third officina being located at the same mint as the first two or at a separate one) and this suggested that, once issued from the central "store" the obverse die never left its workshop. The inscriptional errors and the observed obverse die links by Gricourt et al. confute this as NEPTVNO REDVCI

and PROVIDENTIA AVG are from one workshop while PM TRP COS III PP and FELICITAS AVG are from the other. This may be summarised as follows:

Table 5.3 Inscriptional errors and die links on antoniniani of Postumus

	Officina A	Officina B
Issue II	NEPTVNO REDVCI has obverse die link to MONETA AVG	PM TRP COS III PP has obverse die link to MONETA AVG
Issue III	PROVIDENTIA AVG inspired MONETIA AVG	FELICITAS AVG inspired MONETAS AVG

As the obverse dies appear to have been fixed to the workshop and not transferred between Besly and Bland's A and B workshops the linkage is unusual with the MONETA AVG types. I thus contend that 'officina C' was a mint at a separate location, initially established using existing personnel and equipment. This development would explain the similar styles between all three workshops. If this third workshop/additional mint were to metamorphosize into the Cologne mint then this would explain the merging of the styles and lead to RIC's erroneous conclusion of an earlier move to the Cologne mint away from 'Gaul' and the period of parallel coin types.

The dual mint system operating towards the end of the reign of Postumus allows the revolt of Laelian to be temporally (and spatially, to some degree) placed. The historical sources noted in chapter 2 above acknowledge that the revolt of Laelian took place before the end of the reign of Postumus and this is confirmed by the extant coinage.

This may be summarised by Besly in his review of Schulte's work on the gold coinage of the Gallic Empire^{21,22}.

Besly recognises that the dated issues from the Cologne mint (PM TRP X COS V PP) in both gold and billon ceased abruptly whereas the billon issues from the other mint do not. This suggests that Postumus lost control of the Cologne mint. Furthermore it contradicts Schulte who suggests that the gold is the product of a single mint as gold is now being struck at the recently opened Cologne mint. The interruption is explainable by the revolt of Laelian who coined in both gold and billon.

It is from this period that a trait used to distinguish between the Gallic mints is established, although not immediately. That is, the products of the second mint depict the bust of the emperor radiate and cuirassed bust seen from the front while the first mint used a radiate, draped and cuirassed bust seen from the front. This is not a hard and fast rule as some of the earlier issues of Laelian (sequence according to Gilljam) are draped and cuirassed as are some of the early issues of Victorinus from the second mint²³. Again, during Marius' reign the convention was not apparently adhered to, although the reign was only brief.

This mint differentiation in terms of bust styles does not fit with the end of the reign of Tetricus. The reign of Tetricus is notable for the number of cross mint hybrids, especially from the latter part of the reign. Bland and Burnett suggest that this is due to either a central location for die cutting or, more likely, a consolidation of services when the regime was under increasing pressure from the central regime and the advance of

Aurelian²⁴. This consolidation, they conclude, took place around the time of a weight increase in the radiate base silver coinage and thus coincident with the use of plural reverses on the coinage (excluding PIETAS AVGG which is a lightweight issue).

Thus VIRTUS AVGG, MARS VICTOR, HILARITAS AVGG and SALVS AVGG for Tetricus Senior and SPES AVGG and NOBILITAS AVGG for Tetricus Junior in the base metal issues are the products of the same mint. The similarity of gold types being produced around this time and the obverse die link between aureii of HILARITAS AVGG and NOBILITAS AVGG provides evidence that these were products of the same mint and one may thus assume that the billon coins are similarly associated²⁵. It is the Hilaritas reverse that one would link to the second mint on the basis of the cuirassed bust type in the radiate series but on the basis of the gold links I follow Bland and Burnett in their arrangement of the Tetrician coinage.


Examination of the Cunetio (C) and Normanby (N) hoards shows how confusing this final period of Gallic coinage is.

Summation of the numbers occurring in the Cunetio and Normanby deposits identifies the substantive obverse and reverse types and pairings of the heavier issue coins of Tetricus I in that VIRTUS AVGG is predominantly a mint 1 type, HILARITAS AVGG displays predominantly mint 2 characteristics whilst SALVS AVGG may be divided equally between mint 1 and mint 2 characteristics. There are, however, a reasonable number of Hilaritas coins with some mint 1 obverse traits which muddies the issue. The coins with wholly mint 2 attributes outnumber the coins with wholly mint 1 attributes

in this issue, 2790 to 1944. Although this makes no account for the coins struck in the name of Tetricus II it marks a significant shift in the output from mint 2 which had always been subordinate to mint 1 in terms of the volume of production. There is thus some evidence for consolidation of the mints.

Table 5.4 Comparative numbers of the last antoninianus issues of Tetricus I

Obverse	Reverse	Description	Total C+N
IMP C TETRICVS PF AVG (draped & cuirassed)	SALVS AVGG (Cunetio 2617)	Mint 1 bust & legend	693
IMP C TETRICVS PF AVG (cuirassed)	SALVS AVGG (Cunetio -, Normanby 1493)	Mint 2 bust, mint 1 legend	7
IMP TETRICVS PF AVG (cuirassed)	SALVS AVGG (Cunetio 2653)	Mint 2 bust & legend	759
IMP C TETRICVS PF AVG (draped & cuirassed)	VIRTVS AVGG (Cunetio 2618)	Mint 1 bust & legend	1243
IMP TETRICVS PF AVG (cuirassed)	VIRTVS AVGG (Cunetio 2667)	Mint 2 bust & legend	1
IMP C TETRICVS PF AVG (draped & cuirassed)	MARS VICTOR (Cunetio -, Normanby 1486)	Mint 1 bust & legend	5
IMP TETRICVS PF AVG (cuirassed)	HILARITAS AVGG (Cunetio 2648)	Mint 2 bust & legend	2030
IMP C TETRICVS PF AVG (draped & cuirassed)	HILARITAS AVGG (Cunetio 2664)	Mint 1 bust & legend	3
IMP C TETRICVS PF AVG (cuirassed)	HILARITAS AVGG (Cunetio 2649)	Mint 2 bust, mint 1 legend	51

 = "significant" type

The Cunetio Hoard (Bland & Burnett 1983) gave the opportunity to reconsider the location of the Gallic mints following the publication of the 1973 Beachy Head hoard and in the light of another large deposit. The conclusions they reached were that certainly under Postumus the principal Gallic mint was at Trier whilst the secondary mint opening much later in his reign was at Cologne. However they do not say for certain where the mint of Laelianus was which although it seemed to use personnel that had been connected with the second mint at Cologne it may have been moved to Mainz, the centre of Marius' power.

Similarly following the defeat of Laelian and the rule of the successive Gallic emperors Marius through to the Tetrici they remain non committal as to the resumption of the second mint at Cologne or the establishment of a works at the traditional site of Lyon²⁶. The argument of Lyon, they suggest, is perhaps strengthened by the closure of the secondary mint towards the end of the reign of Tetricus due to the activity of Aurelian. This is, I feel, not plausible as the inscriptional evidence shows that there was a significant amount of Central Empire activity in the area immediately to the south of Lyon from the beginning of the reign of Claudius II onwards, that is from mid/late 268.

Bland and Burnett also try to use hoard evidence to answer the question of the Gallic mint location and whether "mint 1" is correctly linked with Trier and "mint 2" with Cologne²⁷. As well as stylistic and epigraphic reasons, some of which are outlined above, they cite a small hoard from Trier, the details of which are summarised below:

Table 5.5 The "Trier" hoard

	Mint 1	Cologne/Mint 2	Milan
Postumus	62	8	3
Marius	11	3	
Victorinus	25	3	
Tetricus I	-	1	

They recognise that the outputs from Mint 1 and 2 are not even, for example under Victorinus the Normanby hoards exhibits a ratio of 2:1 and Cunetio is also about 2:1 (surely not 1:2 as they suggest). This small hoard from Trier exhibits a ratio in the order

of 4:1, showing an over abundance from one mint in the area and suggesting that this is due to proximity of supply.

There are problems with this assumption. The data is limited to one small hoard and therefore prone to being unrepresentative. There is also the problem with the assumption that the mints put coins into supply in their immediate environs. Harl and Reece have both demonstrated satisfactorily that one of the main reasons for the state producing coinage was to facilitate state payments, for example to the civil service or the army^{28,29}. There is therefore no overriding reason why the nearest mint should have been the source of coin input into the local economy, especially when the mints are located so close together, approximately 65 miles as the crow flies.

The proximity of the mint to the area of supply has been studied with respect to the early fourth century coins in western Europe. In this instance proximity of mint does have an impact on the origins of coins found in hoards, for example London (when operational), Trier and Lyon being the most significant contributors to coins in Britain, although not exclusive suppliers³⁰. The situation was rather different, there were not two mints located so close together as Trier and Cologne were and thus it did not really matter which of the two mints supplied the coins, especially over greater distances, the transportation costs would be approximately equal.

With regard to the actual structure of the Gallic radiates the order published in the Cunetio hoard, as modified by the Normanby hoard is, I feel acceptable. This builds upon the basic order imposed by Elmer and omits a number of irregular issues included

in the listings of Webb. A recent publication on the Gallic radiates differs in the arrangement of the coinage of the Tetrici and it is perhaps worth exploring here³¹.

Schulzki's monograph sets out to establish, amongst other things, the comparative rarity of the Gallic Empire base silver issues as well as noting overstrikes, irregular issues and mules in a chronological context and thus the order of the issues is important. He does not, however, acknowledge that the HILARITAS AVGG coinage of Tetricus I and the PIETAS AVGG/PIETAS AVGVSTOR coins of Tetricus II are struck to different weight standards although he places them as contemporaneous issues from the same mint!

I shall endeavor to deal with the gold coins and associated base metal issues of the Gallic Empire and the bronze coins of Postumus under separate chapters, however similar principals to above will be applied.

A graphical summary of the Gallic Empire mint system is provided in figure 5.1.

NOTES

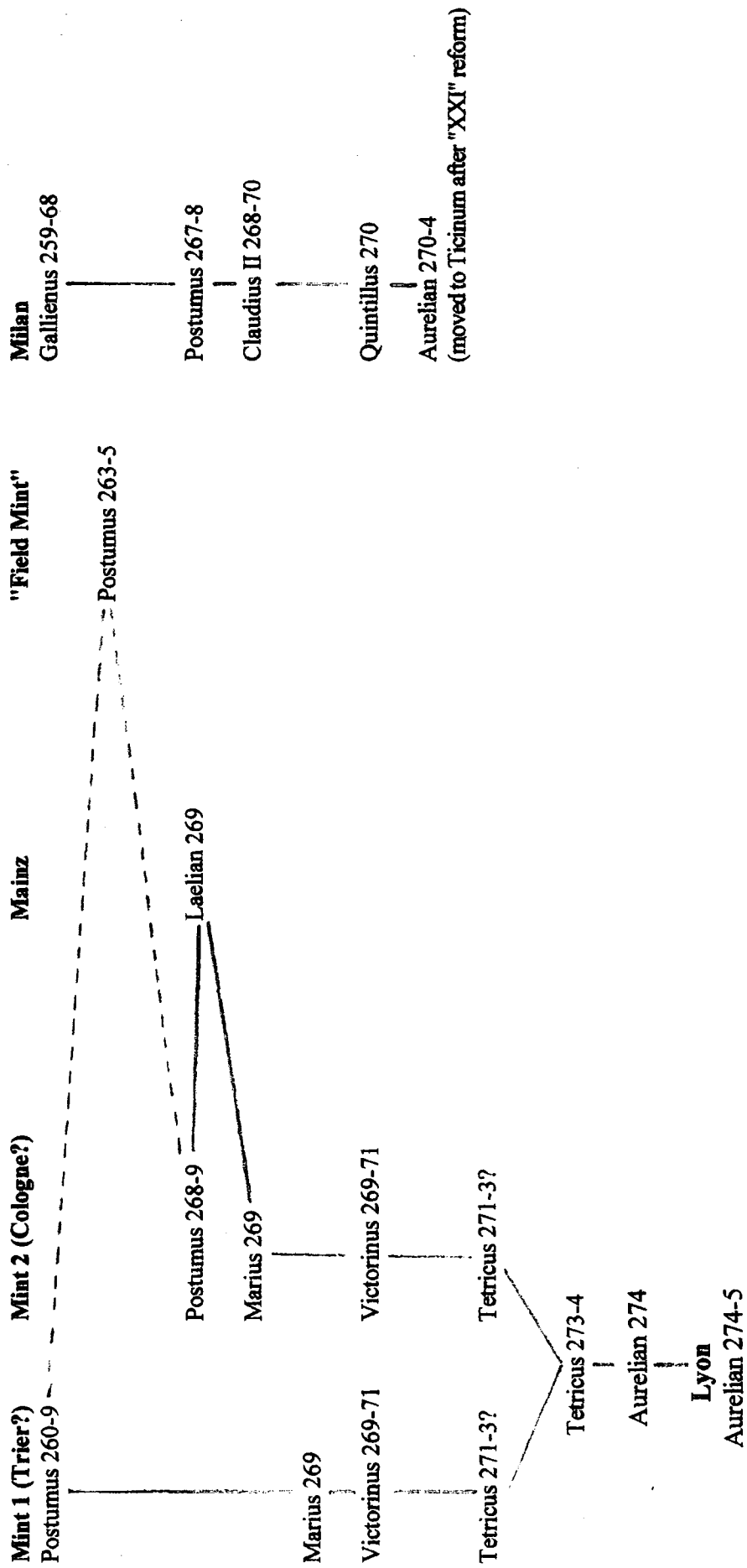
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Figure 5.1 Gallic Empire mints



CHAPTER 6 - THIRD CENTURY COIN CIRCULATION: OUR CURRENT UNDERSTANDING

Before going on to consider the specific patterns of Gallic Empire coin circulation it is worth spending some time outlining what is presently understood with regard to the circulation of Roman coins in the latter half of the third century. One may believe that, given the enthusiasm for bureaucratic control that the Roman coinage would be a homogenous entity in terms of denominational structure and supply, though not necessarily in terms of mint composition. The previous chapter discussing the Gallic mints emphasized the decentralisation of the silver and gold coinage production to the places where the need was greatest, that is in the vicinity of the current military campaigns. It is also worth remembering that the bronze coinage of the western provinces was almost exclusively produced at the mint of Rome. An exception to this rule are the bronze issues from Viminacium in Moesia which have Latin legends and the overt military symbolism of the bull (emblem of the 7th Legion) and the lion (emblem of the 4th Legion) betray their purpose in terms of being produced to facilitate local trading by the legions. Similar coins for the 5th and 13th legions are known from Dacia. Further south in the Balkans and in the east cities of Greek origin were allowed to produce low denomination, autonomous coins for local circulation as a mark of imperial favour and out of respect for their antiquity.

The reasons for the Roman state producing coins must be understood. Gold and silver were the primary coinage metals and of greatest interest to the machinery of

government. By using gold and silver it was possible to move large amounts of wealth in small volumes and these two metals were therefore of use in being able to transport wealth in order to facilitate the payment of the army as well as retrieve precious metals as tax revenue. Bronze coinage, however, was low value and yet high in volume and thus expensive and difficult to transport far. It also had rather limited use, that is it tended to circulate on a local basis and facilitate trading of the lowest order.

The general circulation of coin is represented in the following diagram redrawn from Reece (1977) (figure 6.1)¹. Although it is based upon the supposed method of introducing coin into the Roman economy in the fourth and fifth centuries it is strikingly similar in concept to the diagrams reproduced by Harl (1997) in its principals². That is, there is a differentiation between the mints that struck precious metals and those that struck base coin and the use of money changers was important in dividing the initial supply of precious metal coin into useable fractions and the agglomeration of base fractions into larger units for the payment of taxes. Reece is concerned with the fourth and fifth centuries but it is not far fetched to substitute the Comitatus mint in the diagram for the precious metal mint in the provinces or Rome in earlier periods and the Diocesian mint for the Roman "Senatorial" mint producing and marking the base metal issues, the sestertii downwards.

Is there then a homogeneity in the coinage circulation in the third century, particularly in the western provinces? It would appear that there is not and this has been recognised

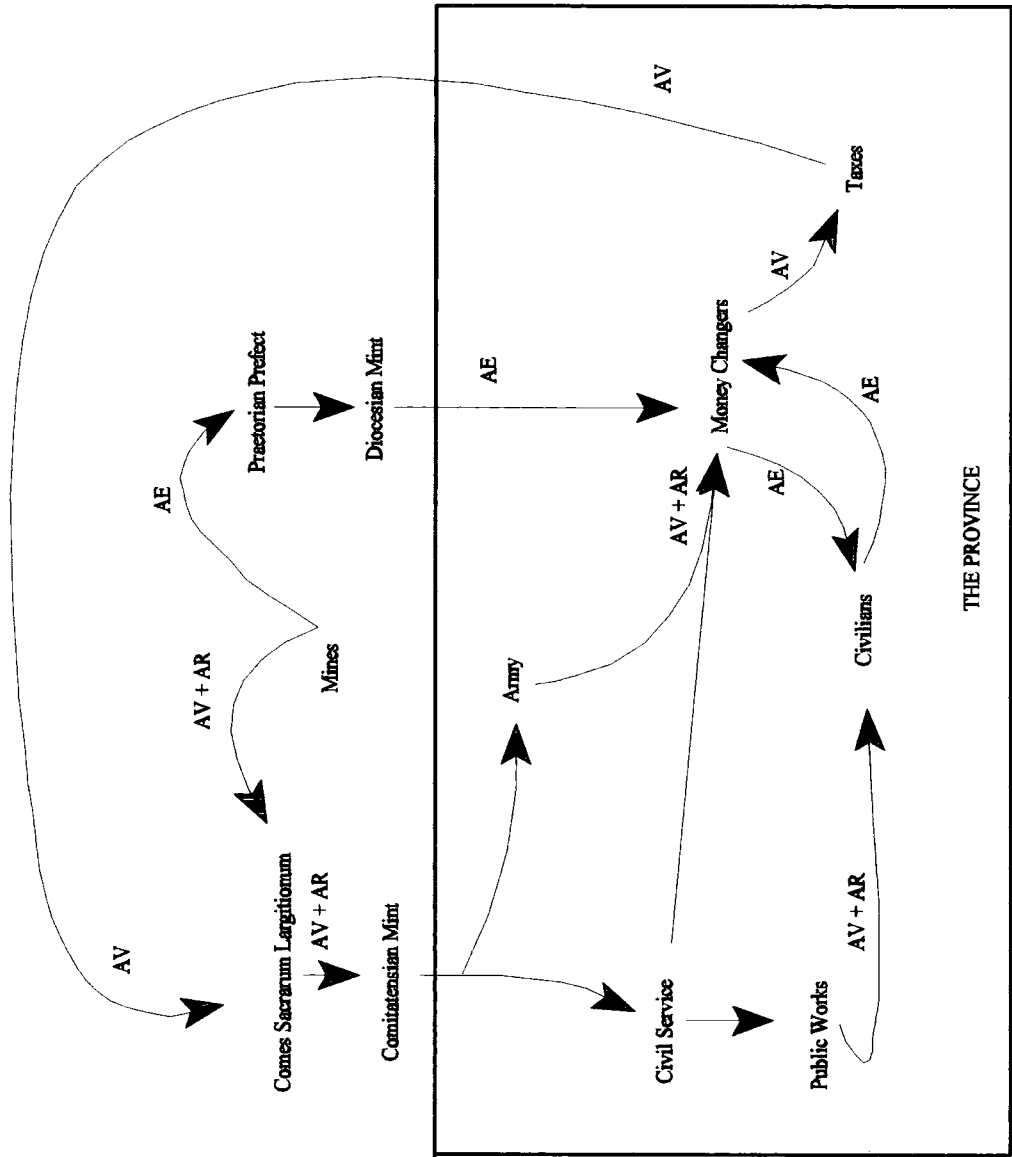


Figure 6.1 Diagram to show the separate circulation of precious metal and bronze coinage in the fourth century (after Reece, 1977, p.646)

by several workers and four distinct patterns have been recognised, along with some minor trends which will be discussed below.

The well known major trends are as follows:

1. Uneven distribution of new coins in terms of the bronze denominations.
2. Scarcity of post Aurelianic reform base silver radiates
3. A gradual East to West movement of silver coins
4. The replacement of the silver denarius with a radiate silver coin

It is proposed to summarise the work on the above series and allude to other works on third century coinage circulation as a grounding for understanding some of the problems encountered when dealing with coin finds of this period.

6.1 The Uneven Distribution of New Bronze Coin

Bronze coinage of the third century was declining in module throughout the century along with, although not necessarily in step with, the reduction in weight and alloy of the silver coinage. By the 270's the bronze had ceased to be a regular component of the currency. The last significant issue of large bronze coins of the "old style" occurring under Aurelian from the mint of Rome which Göbl dates to 274-5 (emission 6)³.

Although some types of the bronze coinage of Aurelian is abundant I am uncertain as to its status. That is, it appears to be an exceptional issue, coincident with the

appearance of Severina on the coinage and the "XXI" reform. There is also a medallion character to some of the issues in as much as there are a number of pieces struck from regular dies on oversized flans and a bust type on others which show Aurelian on the obverse laureate wearing a *trabaea* with his right hand raised for example.

As already stated above the issuing of bronze was virtually exclusive to the mint of Rome and therefore provinces were dependant on supply from a single source. It has become apparent from the study of hoards in Britain and Gaul that during the third century very few new bronze coins were introduced into circulation in these areas. Indeed, Buttrey suggests that the bronze supply to that area begins to decline towards the end of the reign of Commodus (177-92AD)⁴. This may be associated, he suggests, with the decline in alloy of the denarius under Septimius Severus in 194 although the reason for this correlation he admits is unclear. Why should a particular geographic area be subject to economic forces that were not prevalent elsewhere with respect to the introduction of new bronze coins? I can understand that there may well be a restructuring of the denominational relationship to take into account a precious metal debasement, but this should be an empire wide effect.

Richard Reece drew upon the data he collected from site reports and from museum collections in England, Northern and Southern France and Northern Italy as a way of inferring the coins that were in circulation within the study area⁵. By using collections as well as hoards and site finds there is always the question over the whether the coins being recorded as being representative of what was circulating and being lost within the

area. Reece is reasonably confident that any patterns discerned are a reflection of ancient patterns rather than being under the influence of modern circumstances.

The study attempts to look at three relationships in relation to the third century by plotting:

- The absolute number of sestertii recorded within a given period of issue. In summary the plots demonstrate that after the period 180-92 through to 259 very few later sestertii are recorded. There is a drop off in Northern France over a similar period although in contrast to Britain sestertii do continue to circulate. Northern Italy by contrast shows an increase in sestertii through the third century.
- The ratio of the sestertii to the denarii. Once again there is a marked contrast between the northern locations and the southern ones. The northern sites have a greater proportion of silver to bronze through the third century whereas the southern ones tend to be within the 20% band either way.
- The ratio of the sestertius to the lower bronzes, the dupondii and asses. There is a decline in the fractions of the sestertius in all four areas studied. The only exception to this pattern is Italy which in period X (259-75 AD) shows an increase in the ratio of sestertius fractions. Although this is not within the body of the text I suspect that this is a demonstration of the circulation area of the as

issued in some numbers by Aurelian from the mint of Rome c.274 AD. The decline in the smaller denominations is to be expected given the debasement of the silver coinage, reducing its purchasing power in relation to the silver. Does this however also indicate an increase in the relative value of the sestertius making it a more desirable commodity to possess?

Germany was excluded from Reece's study but Callu suggests that new bronze was introduced into this area at a later date than in Northern France and Britain due to the military campaigns of Maximinus against the Alemanni⁶.

Hodder and Reece employ mathematical modelling to describe the circulation of bronze coinage, particularly sestertii, in the western Roman Empire up to 259 AD⁷. By undertaking a form of regression analysis and examining the residuals they identified a number of spatial trends. For example along the Rhine there are greater numbers of sestertii than expected in the period 138-161, 180-192 and 222-238. This would seem to conform to areas and periods of military activity and would support the ideas of Callu⁸.

The lack of new sestertii circulating in Northern France and Britain has a profound effect in attempting to date and interpret bronze coin hoards in these areas. Where later coins do occasionally occur, for example the bronze deposit from Aldborough (Yorkshire) deposit, cited by Callu⁹, they show how unusual post 192 bronze coins are:

Table 6.1 The Alborough hoard of sestertii

1st Cent	47
2nd Cent	114
193-222	1
222-235	2
238-244	2
249-251	1
253-260	1

Given the distribution in the above find it is easy to imagine finds of sestertii in Britain and Northern France which terminate in terms of the date of their manufacture potentially much earlier than their date of deposition. Subjective assessment must therefore be made as to the degree of ware. This again was a feature discussed by Buttrey¹⁰. An example of this is a small hoard of sestertii from Aiskew, North Yorkshire¹¹. The deposit is small, only five coins, with coins ranging from Domitian through to Hadrian. The coins were fused together and, after separation, seen to be very worn. Is this then a deposit from the mid second century or from the mid third century?

A further demonstration of the scarcity of post 193 AD sestertii in British deposits is provided by Cathy King who tabulates 26 hoards from the time of Hadrian¹². From a total of 2574 sestertii only 73, including those of the Gallic usurper Postumus, are identifiable as being issued after the reign of Commodus, that is, about 2.8%.

6.2 Scarcity of Post Aurelian Reform Base Silver Radiates

Another distinct feature recognised when dealing with coin finds of the mid to late third

century is the scarcity of the base silver coins introduced in the coinage reform of Aurelian. The majority of these pieces bear the mark 21 in either Latin (XXI) or Greek (KA) figures. The marks have been the subject of much debate over the years, many arguments being centred around denominational relationships, eg 20 sestertii equate to 1 radiate.

The denominational relationship of these XXI coins to the pre reform radiate is not now in doubt due to an unpublished fragment of the Aezani document¹³. This stone inscription when added to the fragments already recorded talks of a "bicharactam pecunia" being the coin that the rest of the world knows as a four denarius piece. The bicharactam pecunia referring to the two standing figures so prevalent on the reverses of the eastern radiate coins. This would make Aurelian's laureate bust fractions so often referred to as "denarii" in the literature into being equivalent to the old antoninianus.

On the basis of the published analyses that are available for these coins I am in agreement with Bolin who suggests that the XXI formula is the ratio of base metal to silver¹⁴. The 20:1 ratio would give a theoretical silver composition of 4.76%. Using data published by Cope et. al. an average silver composition of 4.63% is obtained from 15 specimens (analyses from Rome, Cyzicus, Lugdunum, Siscia, Ticinum and Tripolis mint specimens)¹⁵.

That the XXI formula is a reflection of the alloy is further supported by a further type of coin with similar marks, that is the XI, X ET I and IA marked base silver radiates of

Tacitus and later emperors. The analyses published by Esty, Equall and Smith suggest that these coins are of a higher silver composition (7.24%)¹⁶. Their results are quoted over a broad range but they also cite results obtained by Callu, Brenot and Barrandon which suggest that the alloy is in the range of 8.75% to 9.8% silver¹⁷. By taking XI as referring to the ratio of base metal to silver the theoretical silver composition should be 9.09%.

From the tables published by Göbl the following summary of mints and marks may be compiled for the reign of Aurelian¹⁸.

Table 6.2 Marks on the post reform base silver radiate coinage of Aurelian

No Marks	XX	XXI	KA
Lugdunum	Ticinum	Ticinum	Serdica
Cyzicus	Serdica	Rome	Tripolis
Tripolis		Siscia	
		Serdica	
		Cyzicus	
		Antioch	

There is some geographical logic in whether Latin or Greek marks are employed under Aurelian, that is western and central mints use the Latin characters, although by that logic Antioch does appear to be an exception. This pattern did change through time, for example, Rome is known to have used the mark KA from the reign of Probus. The mint which consistently did not mark their coinage in this way is Lugdunum, although other

forms of marks were used to denote issue and workshop. This has been seen as significant by some.

Mattingly suggests that the lack of mint mark on the post reform coins from Lugdunum that the new denomination was unpopular, particularly as the coins are so rarely found in Northern France and Britain¹⁹. The unpopularity he suggests may be due in part to the circumstances of the monetary reform and the way the new current was introduced. The old currency that was circulating was predominantly that of the Gallic usurpers and therefore, he suggests, was redeemed at a disadvantageous rate.

There may be some substance to this in the writings of Zosimus²⁰:

".....Tetricus and the other insurgents were easily subdued and punished as they deserved. Now he officially issued new money after arranging for the state to buy in the debased coinage to avoid confusion in financial dealings" (Zos. I.61)

This does suggest that the pre reform coinage was demonetised and recalled by the state. However it has been suggested that given Zosimus' eastern origins he is alluding to an edict that was only valid in the east. There was certainly a reform of the Egyptian billon tetradrachm at approximately the same time as the radiate coinage from the western and central mints. Not only that but there is evidence that the tetradrachms of Aurelian, predominantly years 4 and 5 (both prior to the suggested reform date), were overstruck by Aurelian and his successors²¹.

Alternatively it has been suggested that Zosimus' text could refer to the defeat of Felicissimus and the so called revolt of the moneyers at the mint of Rome during the reign of Aurelian when many sub standard coins were issued.

Given that only Tetricus is given a special mention in the text referring to the monetary reform I am in a mind to side with the theory that the reform was of the western coinage and not just referring to the east. Zosimus paid much more attention in his history to the revolt of Vaballathus and Zenobia than that of the Gauls thus when they get a specific mention in the same sentence as the monetary reform there must be some connection.

There must be some significance in the Lyon mint not marking the post Aurelianic reform coinage with XXI that is peculiar to the region as Carausius too initially did not mark his coins. In not doing so there is also support that the meaning of the XXI/KA formula refers to the alloy of the coins themselves rather than being a denominational or mark of value, for example a twenty as piece.

The sequence of mint marks at the London mint of Carausius may be determined as follows:

Table 6.3 The sequence of reverse marks on the radiates of Carausius

Without title CAESAR on obverse				With title CAESAR on obverse		
None	-//ML	F/O//ML	B/E//MLXXI	B/E//MLXXI	S/P//MLXXI	S/P//ML

The title Caesar is thought to have been incorporated into the titles c.290AD and seems

to mark a shift in the stance of the regime towards association with the rule of Diocletian and Maximianus, rather than revolt. When the peace is broken and the continental possessions are once again lost by Carausius the XXI formula disappears²².

Furthermore Casey notes that there is negligible silver content in the radiates of Carausius until the MLXXI mark occurs²³. This thus gives a probable link of the silver content to the mark.

Cathy King is sceptical of the unpopularity of the XXI coins in Gallic territories²⁴. Her interpretation is that there is a physical scarcity in northern Gaul and Britain rather than rejection. I do not understand how this conclusion is reached as she supports this theory by comparing Northern Gaul and Britain with Southern Gaul. In doing so she contrasts the high numbers of local "barbarous" radiates of the former two areas with the latter which has comparatively few such coins. All three areas have relatively few post Aurelian reform coins. Her suggestion is that the northern provinces produced the local radiates as a means of alleviating the shortage of official coin and as a way of producing useable denominations in every day trade but acknowledges that this does not appear to be the case in Southern Gaul. In her paper there is even the admission that after the collapse of the Gallic Empire:

"...ensuing price inflation and apparent inability of the government to enforce the public acceptance of the official value placed on coins could have stimulated both counterfeiting and selective hoarding".

This seems contrary to her argument on the coin circulation post Gallic capitulation.

6.3 The gradual East to West movement of silver coins

Roman coins have been recognised to have a general shift from eastern to western provinces during the third century AD. Two papers identifying this trend have been published by Robertson and Howgego^{25,26}.

The former was able to identify through work on her yet as unpublished "Romano-British Coin Hoards" (the long forthcoming Royal Numismatic Society Special Publication) that there were a number of coins from eastern mints present in hoards deposited in Britain. Of particular interest to this study are the finds of eastern coins in hoards from the reigns of Gallienus and Postumus onwards. A shift is identified away from Antioch and towards Siscia from around the time of Claudius II as being the eastern mint city that supplied either directly or indirectly these coins to Britain.

Around the same time there is an apparent increase in the absolute numbers of these eastern coins. This continues through until the reign of the British usurper Allectus at the end of the century. The change from the "sporadic trickle" to a "continuous steady flow" Robertson surmised might have been an official supply²⁷.

Another feature that Robertson identifies is that whilst there is this east to west drift in coins during the third century there is a lack of coins of the eastern usurpers. For

example the Normanby hoard, terminal coin date c.289, contained only a single coin of Quietus in nearly 48000 coins²⁸. Cunetio, terminating in the official coin record in 274, contained a total of 10 coins of Macrianus and Quietus in nearly 55000 coins²⁹. Similarly only a single coin of the Balkan usurper Pacatian is recorded as being found in Britain from the Stevenage hoard³⁰. Given the rarity of the coins of this usurper Bland identifies at least four coins of western provenance out of a corpus of 69 coins.

One western hoard where the coins of the eastern usurpers Macrianus and Quietus are present in large numbers is the Gibraltar hoard (also known as Serrania and Jimena de la Frontera)^{31,32}. In this find from southern Spain over 1100 coins of the above were present in a hoard totalling just short of 30000 coins. This find is unusual, terminating with coins of Gallienus's last Rome mint issue, c.267/8 AD and Postumus's fourth issue coinage from around the same period. This hoard may then be of the period of the switch of allegiance of the Spanish provinces away from the Gallic Empire back to emperors in Rome.

Howgego's paper on east to west coin movement in the third century identifies four periods of significant coin movement, namely coins of Septimius Severus, Gordian III, Trebonianus Gallus/Volusian and Valerian/Gallienus³³. In doing so there is the suggestion that these coins do not move by chance as some form of natural current but that there was a reason behind the translocation. The Antioch mint antoniniani of Gordian III are superior in alloy to their Rome mint counterparts and Howgego is surprised to

observe that the proportion of these coins increase in British hoards during the period 263-74 as opposed to 248-61.

Table 6.4 Gordian III hoards from Britain

	Terminal Date	Antioch Mint	Rome Mint	Total	% Antioch
Elvedon	248	2	104	106	2
Lime Street	251	1	182	183	1
Dorchester	257	564	8385	8949	6
Edlington Wood	259	3	59	62	5
Mattishall	261	9	139	148	6
Stevenage	263	25	173	198	13
Crowmarsh	265	3	31	34	9
Caister-by-Yarmouth	267	5	84	89	6
Beachy Head (1964)	269	26	270	296	9
Oliver's Orchard	269	5	51	56	9
Selsey	271	3	19	22	14
Chalfont St. Peter	274	9	108	117	8

(After Howgego (1996) Table 2a)

Calculation of the mean Antioch mint composition shows there to be an increase from 6% during the period 248-61 to 12% during the period 263-74, based on the above limited sample. Howgego points out that similar trends are not noted in France or Belgium but this may be due to hoard reporting not allowing accurate identification of the Antioch coins of Gordian which has been problematical thus masking any pattern.

The difference in the alloy of the Antioch coins was demonstrated by Callu and his graph

is supported by the recent republication of Walker's analyses and those by Gentillhome, although in the Neftentenbach hoard the opposite is true, the Antioch mint coins of Gordian III are of significantly poorer alloy than those of Rome^{34,35}.

The Neftenbach hoard results may be summarised as follows:

Table 6.5 Metallurgy of the Gordian III radiates in the Neftentenbach hoard

Gordian III	ROME		ANTIOCH			
	Av. Weight (g)	% Comp Ag	Av. Weight Ag	Av. Weight (g)	% Comp Ag	Av. Weight Ag
Issue 1	3.76	40.86	1.54	4.75	37.72	1.79
Issue 2	4.68	38.42	1.80	4.56	37.22	1.70

By multiplying the average weight of the specimens by the percentage silver composition to calculate the amount of silver present in each coin a yet different picture emerges, that of an increase in the silver composition at the Rome mint under Gordian whilst there is a decrease at the mint of Antioch.

This variability in the recorded results is probably a product of the analysis methods used, the methods of preparation of the specimen for analysis countering, for example, surface enrichment of silver, as well as alloy variability from the time the coins were made.

Thus it would seem that basing an argument on the alloy of the coins favouring the eastern issues of Gordian over those of the Rome mint is difficult to support.

6.4 The replacement of the silver denarius with a radiate silver coin

Although this is not strictly a recognised coin circulation phenomena the replacement of the silver denarius in the Roman currency system by the radiate silver coin there were consequences to the coin circulation and hoarding patterns. The introduction of the radiate silver coin and its effects on the currency system as a whole are summarised by Roger Bland in SFMA 10³⁶.

He questions the traditionally held view that the radiate silver coin introduced by Caracalla was a two denarius piece until the reform of Aurelian in 274. He demonstrates that the coin initially had a silver content of approximately 1.6 denarii and may have been an expedient move in the light of increasing the pay of the soldiers. At the same time he illustrates a lowering in the weight standard of his gold aureii from the Rome mint from 7.2g to 6.5g. Macrianus makes an initial issue of lower weight gold coins and silver radiates before restoring the gold weight and issuing denarii instead of radiates. Elagabalus made an attempt to reintroduce the radiate silver coin and again lower the weight of his gold coins but reverts back in 219 to denarii and the heavier gold. The radiate was not reintroduced until the reigns of Balbinus and Pupienus in 238, some nineteen years later. This time a comparison with an issue of denarii of Gordian III from 241 shows the ratio to be nearer to 1.38 denarii to a silver radiate.

Bland thus postulates whether the initial radiates of Caracalla were valued at between 1.75 and 2 denarii while the later introduction of the radiate silver coin is perhaps as a 1.5 denarius piece, arguing that by this time the radiate crown had lost its significance

as indicating a double value coin before then going on to discuss the relationship between the denarius and the radiate in hoarding patterns. Before reviewing that part of his work I want to briefly look at the significance of the radiate crown on these issues.

Bland feels that the significance of the radiate crown is ambiguous³⁷. He notes that the radiate gold coin of Caracalla and Severus Alexander each weighs approximately twice as much as their respected aureii and thus the symbolism is apparently still recognised from the first and second centuries where, for example, dupondii (2 as pieces) are radiate whereas ases are not. However by the time of Trajan Decius the radiate gold coin is the weight of only 1.5 aureii and by the time of Valerian and Gallienus radiate gold and 'regular aureii' (my quotations) are interchangeable in the broad range of weights for the coins. Thus all his examples showing the erosion in the meaning of the radiate crown are based on gold coins, coins which he himself accepts as being outside the routine denominational structure and having a market driven value.

He may well be right, there is sufficient reason for tariffing the post reform radiate of Aurelian at either five or, more likely, four denarii (see, for example, Casey, 1994, and Erim et al, 1971, Carson, 1965 plus above regarding an unpublished fragment of the Aezani text which apparently resolves this), yet the coins still bear the radiate crown^{38,39,40}. This would then be used not to signify a double denarius but possibly one post reform coin equating to two pre reform coins, maintaining the significance of the radiate crown.

Further evidence that the radiate crown had not lost its meaning may be seen in the rare series of base silver radiate coins marked XI, X ET I or IA. Although the results are not conclusive as there is much variation these coins struck under Tacitus and successive emperors at the eastern mints of Antioch and Tripolis have a silver composition of approximately 10% compared to the 'XXI' marked coins of the period which approximate to 5%⁴¹. Similar coins, as yet with no supporting chemical analyses, are known from Lyon and Cyzicus under Carus and Carinus. Webb comments on the unusual nature of the coins, postulating, without the benefit of the later analyses, that they are of a higher denomination⁴². Many of these coins have a double bust, for example Carus and Carinus (thus ensuring two radiate crowns) or the emperor and Sol. At Lyon under Carus the bust of the emperor on the X ET I marked coin is given two radiate crowns. Cathy King also comments about the double radiate crown on certain late radiates marked X.I and XII, speculating that, given the lack of supporting analytical evidence, that these coins represent double radiates or at least are special, possibly donitival, issues⁴³.

Thus I feel that the significance of the radiate crown is not lost through the third century. This then brings me back to how the denarius and the radiate silver coin circulated together in the light of their probable denominational relationship.

Bland, in a brief survey of the hoards of the third century empire wide concludes that there was a decline in the ratio of denarii compared to radiati through the period 240 to 274. This was, however, a gradual decline, not a rapid driving from circulation of the

older coin. The pattern is uneven across the empire but to both Bland and Carson this does not appear to be the expected behaviour if the radiatus was significantly overvalued when compared to the denarius⁴⁴. In this respect one may have to concede that the later (pre Aurelianic reform) radiates were not two denarius pieces.

The gradual disappearance of the denarii outlined above assumes that the denarii being hoarded with the radiates are contemporaries and thus declining in silver at similar rates. It makes no allowance for the debasement of the radiates and therefore an increasing differential in the relative value of the two coins.

This may be demonstrated by looking at the weight of silver in the coins. All the quoted analyses below are of specimens from the Rome mint:

Table 6.6 Metallurgy of denarii (D) and antoniniani (A) in the early to mid third century, expressed as weight of silver

Caracalla	D=1.92g (Cope 19,20); A=2.27g (Le Gentilhomme)
Elagabalus	D=1.64g (Cope 21); A=1.93g (Cope 73), 1.69g (Neftenbach)
Maximinus	D=0.56g (Cope 22)
Balbinus/Pupienus	D=?; A=1.77g (Neftenbach)
Gordian III	D=1.31g (Le Gentilhomme); A=1.59g (Neftenbach)
Philip I	D=?; A=1.41g (Neftenbach)
Valerian I	D=?; A=1.08g (Neftenbach)

(Cope and Neftenbach analyses see note 13; Le Gentilhomme see RN 1962⁴⁵)

Thus, the weight of silver in the radiate coins of Gordian III equates to approximately that of the denarii of Elagabalus. Indeed Besly is able to demonstrate that radiates from the mid third century can be found overstruck on earlier denarii, illustrating a radiate of Trajan Decius overstruck on a denarius of Geta, the name of the latter being clearly visible on the reverse⁴⁶. Might not the slow disappearance of the denarii from the late second century/early third century be an indication of a false value/worth being attached to them? Do they begin to be used indiscriminately with radiates until the significant decline in alloy at the Rome mint in the 260's?

There is a complication in what the papers describe as "savings" and "currency" hoards. That is there is a recognised differentiation between deposits that are hidden away and topped up at intervals, thus containing archaic coin types, and those which are to be regarded as a petty cash fund which reflect the coins currently circulating. Is it possible to determine whether the Severan denarii are only present in "savings" hoards? I feel this is difficult as an amount that would represent a currency to one may represent savings to another and it is seldom that one can determine the status of the owner. Thus it is not possible to say at what level of coins in a third century deposit there is a transition from one type to another, one may only be certain about the extremes such as Cunetio⁴⁷.

An examination of the tables in Callu (pp 267-8 but also 270), breaking down the composition of a number of hoards both west and east of the Alps hoards of all sizes, shows that Severan coinage is present in hoards of all sizes through to the 260's⁴⁸.

I am not aware of any extant texts which support this point of view, nor any current numismatists but it would explain how two coins of similar silver content but, on the face of it two distinct denominations, could co-exist. There is no way of knowing when any such change in the treatment of the denarius but it may have occurred around 240 AD, shortly after the reintroduction of the radiate coin on a permanent basis which was also the time of an issue of denarii by Gordian III, an issue which Bland recognises as being of finer alloy than the contemporary radiates.

There are intermittent issues of laureate and bare head base silver coins after Gordian III but these are not common until the reign of Aurelian. King suggests that these are special issues, possibly connected with the donativa and this is likely given that, particularly with the Gallic usurpers, there are die links to the gold coinage⁴⁹. There is insufficient analytical data, due in no small part to the rarity of the coins, to make a sensible judgement about their denominational relationship with the other coins. My previous comments only refer to the Severan denarii, their similarity in alloy to radiate of the 250's leading to their overstriking and their continuing presence in third century hoards.

Now that I have summarised some of the currently acknowledged coin circulation patterns of the third century AD there is a frame work to overlay more specific patterns of coin circulation. These patterns are a reflection of specific actions in addition to the more general trends and offer an insight into the politics of the period and the more subtle movements of money.

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CHAPTER 7 - THE ANALYSIS OF THIRD CENTURY RADIATE COIN FINDS

The movement of money, either through the issue of new coins or through trade is, I believe, important in being able to assess the relationship between the Gallic Empire and the Central Empire. The histories demonstrate that there must have been some kind of unsteady peace between the two regimes initially as there was not an immediate counter attack and invasion of the lands under the control of Postumus. The reasons for this have been examined above. Similarly the diagram reproduced in chapter 6 illustrates that the primary reason for issuing new coins was to facilitate state payments. So how did the Gallic Empire operate with respect to the circulation of coins? Was there some form of systematic despatch of new coins to specific areas, that is, new coins being sent to the areas of greatest military activity? Finally, was there an economic segregation of the two regimes so that the Central Empire coins did not move freely into the Gallic Empire and vice versa?

In order to try and answer these questions coin find inventories were initially tabulated and their contents listed. This was not done at reverse type level but rather by issue groups for mints. The establishment of such groups has been accomplished over the past seventy years for large parts of the Roman coin corpus. By grouping coins of similar portrait style and obverse legend, taking into account any evident officina or other privy marks the sequence of issues for particular emperors may be known, even if one cannot for certain the length of the period over which they were issued.

There have been several such attempts to arrange the Gallic Empire coinage, outlined

in chapter 5 above, and while there may not be complete agreement over which issues to include in particular groups, for example the HILARITAS AVGG reverse on the antoniniani of Tetricus I, the general sequence is fairly robust. Discrepancies do not make examining the coin find records an easy task, especially if the coin finds are listed in groups by just their Elmer or RIC number as cross reference must be made back to the original catalogue to ensure that a rogue type has not been included in an inappropriate group¹². Fortunately this practice is becoming less frequent in listings but one only has to go back ten years or so for it to be a common occurrence. One of the few still listing finds in this way is the German "Fündmunzen" series³.

Problems with individual series has dictated which data sets have been used for analysis and these are identified under the emperors concerned.

Another problem which has been harder to address when accumulating the data has been the inclusion of irregular coins as official mint products. The reasons for this are many fold but may be summarised as follows:

The standard work of reference for Roman coin types is still Roman Imperial Coinage, the volume covering the Gallic Emperors being published in 1933⁴. At that time many radiates of probably dubious quality were unwittingly included amongst the official issues, thus causing a fair degree of confusion amongst people unfamiliar with the coins as to what to accept and what to reject. For example, although it is not illustrated one may be confident in rejecting the radiate of Tetricus I with reverse NEPTVNO CONS AVG, hippocamp right (RIC 96) as a local radiate mixing a Gallic obverse with the

reverse of a coin of Gallienus. On the same page there is a coin of Tetricus with the reverse ORIENS AVG, Sol walking left, in the left field the letter P (RIC 98). The reverse is a duplication of the one used by Postumus, even down to the control letter "P" in the field. The letter "P" occurs at the Trier mint under Postumus for one issue and appears to mark post debasement coins where the reverse design hadn't changed. That the letter is the emperor's initial becomes clear when a field mark of "V" was used at the same mint under Victorinus. One does not have to look hard for other examples of the mixing of incongruous obverse and reverse types.

That is not to say that new types cannot come to light. The Cunetio hoard contained two coins of Victorinus with the reverse ORIENS AVG, Sol walking left, right hand raised. This is a known reverse type of Postumus and thus one had grounds to doubt the status of the mint which produced them for Victorinus⁵. Indeed RIC lists a similar type but with the letter "P" in the left field (RIC 115). However, by studying the dies of the two Cunetio specimens and a third example in the Childs Ercall hoard which shared the same reverse die it was concluded by British Museum staff that the obverse dies were official and therefore accepted the coins as official products, even though one of the Cunetio specimens had a blundered obverse legend (PIAV being rendered as PAIV), the coins being produced using an old reverse die from the reign of Postumus⁶. This is feasible as a contemporary issue of Victorinus is the INVICTVS type, again with Sol walking left. At least the coins are illustrated which allows for a valued judgement to be made.

Similarly if people are accepting obverse/reverse combinations that are not plausible there is the possibility of accepting imitations of coins with the correct obverse and

reverse pairing. Whilst the irregular coins of the first type may be possible to weed out this second group is almost impossible if the coins are not illustrated. I have had to accept all coins in these situations and cannot account for the false coins accepted as official. This is a very thorny subject as not only was there local Gallic production of radiates, historically called "barbarous radiates" which are examined in a later chapter but also a phenomena, the scale of which is only just becoming apparent, that is fraudulent mint practice producing small underweight coins.

To this latter practice Robert Göbl devoted many plates in his corpus of coins of Aurelian and in a review Markus Weder sought to correct some of the mis-attribution of Gallic local radiates to fraudulent Rome issues and set down his method of determining a fraudulent coin from an official mint against those of local manufacture^{7,8}. Essentially the diagnostic features are that the irregular coins from an official mint will be perceptibly round, have filed edges and the prototype dies will be from the "non Gallic" stock⁹. The Gallic radiates are predominantly of Gallic Empire types although this is not exclusively so and can be demonstrated with obverse/reverse mules where Gallic and Central empire coin types are mixed. Confusion occurs as both types occur in British and French hoards and Weder has demonstrated by an examination of the prototypes used for copying that the non Gallic irregular radiates were being produced up until the time of Diocletian (284-305)¹⁰. There is thus a significant overlap with Gallic irregular coins, the bulk of which seem to have been produced between 273 and 282AD¹¹. Take, for example, the forger's deposit from Coygan Camp in Wales with a small number of coins in the name of Probus¹². This must demonstrate that the Gallic copies are being made into the 280's, although the small module imitations purporting

to be Gallic copies of Carus and the Magnia Urbica in the Ashmolean Museum cited by Hill cannot be substantiated as anything other than misreadings of coins of earlier prototype^{13,14,15}.

Finally the assessment of the quality of the fabric of the coin is not possible from older, text only lists of finds. The Normanby hoard was listed differentiating good and poor fabric coins from official sources but it is by no means certain how far along the line a coin's fabric must deteriorate before it stops being a poor quality coin of official manufacture and becomes an irregular coin fraudulently manufactured¹⁶.

Given the above pitfalls journals and monographs were searched for hoard and site find information on the third century radiate hoards that listed the contents by type, eliminating the obviously irregular specimens. The contents of the find were tabulated by emperor, mint and issue initially as actual numbers. Blanchet's reference on the Gallic hoards listing many of the nineteenth century hoards from the former province of Gaul has proved virtually worthless in this exercise for while he lists a great number of hoards of the period and gives an outline of their contents it does not enumerate the issues of the emperors or list their reverse types¹⁷. Furthermore the references given can be obscure and difficult to obtain, for while the *Revue Numismatique* is accessible in some British libraries others, such as the *Extraits des procès-verbaux de la Soc. d'émulation d'Abbeville, 1877-80* are not.

Even by taking Callu's tables, breaking down enumerated hoards by emperor Blanchet's listing cannot be used as the resolution is not sufficiently fine¹⁸.

The German FMRD volumes also presented a similar problem for while this series has undertaken the massive task of compiling a compendium of German Roman coin finds it seeks to list not only recent finds by area but also historical finds. In many cases the original find has long since been dispersed and one is left with a tantalising snippet for example that a hoard was found at Huttersdorf (FMRD III, 1133) which contained around 2000 coins of the emperors Gallienus through to Tetricus which have long since been dispersed.

The FMRD and the associated FMRL volumes also list the contents of museums which are assumed to be the products of local finds. These are, however, subject to contamination, either through the mixing of finds into one large accumulation, which does still have some research value as it gives an overall picture as to what types were circulating in the area or, more seriously, through the addition of collections of coins through bequests etc. While one may make an assumption as to the locality of the coins in question there is no way of being certain that they were not purchased from a dealer who acquired them from another area or even country.

The use of museum collections has taken place previously and certainly one worker has gone on record to argue for the merits of using this type of material. In a paper examining the site finds of Roman Britain Reece explains his reasoning¹⁹. The inclusion of the entire Lincoln museum collection of coins in a study on Romano-British coin finds, which contained unprovenanced coins, imports and collector's coins apparently did not affect the coin patterns as demonstrated by recorded excavation 1970-9 but rather served to bolster the pattern of coins from the area.

Such comparisons can be made where it is possible to compare the distribution of unprovenanced coins with those of a known find location. However if one is faced with a group of coins and one cannot differentiate the two groups then the exercise embodies a significant risk of skewed results. Thus I have sought to try to eliminate collections and unprovenanced finds.

Another source of material which defies the hoard/site find definition and which is prone to problems of interpretation are grave finds, coins deposited as part of a funerary ritual. Whilst the coins may reflect what was available in the vicinity this need not necessarily be the case. An example of an area where grave goods, including coins, are frequent is the area outside the Roman Empire to the east of the Rhine. Bursche has made a study of the finds in this area and has identified periods when coins were manufactured which left the empire, inferring contact with the Roman Empire whether they be mercenary payments, tributes or trade²⁰. The coins, particularly gold, become integrated into the material culture and find their way into the ground as casual loss or grave deposits. Whilst it is possible to determine with some certainty the period of manufacture of the coin its date of movement is less certain and the date of deposition even less still. Thus grave coin finds, although deliberately concealed and often contain more than one coin, are treated as site finds for the purpose of this work.

The analysis undertaken was to initially examine whether there was any difference in the relative proportions of coin issues. This could be used to, for example, determine whether one area was over represented by a particular coinage issue or whether the coin

pool was a homogenous entity, issues being evenly distributed. This methodology takes no account of time and the underlying assumption must be there is no temporal change.

In order for this to be true the base metal radiate coinage, once issued to an area, would continue to circulate in that area and not be subject to long distance movement. This was examined in chapter 6 above where Reece's diagram of money supply was reproduced illustrating the mechanisms of movement and demonstrating the primary reason for coin moves being to facilitate state functioning. This primarily involved gold and silver coinage, rather than the base metal, and it is a moot point as to whether the debased base silver radiates should be treated as silver or bronze coins for this purpose, assuming that Reece's fourth century model is applicable in principal in the third century.

Models of dissociation have recently been published, taking as a coin pool the Roman Republican coin series²¹. The series of graphs produced illustrate how coin inputs into two areas within the same sphere of circulation spread through time by exchange and transaction until the ultimate homogeneity is achieved. There is no indication as to the length of time involved before this state is achieved nor is it possible to determine for my own study the state at which any particular Gallic issue reached, if, indeed the same mechanisms were operating on the base metal coinage. One must bear in mind that the base metal Gallic coins may not have been used in longer distance transactions and the recycling of the later very base issues through the fiscal system may not have occurred.

In order to begin the analysis the totals for each issue of coin were graphically

represented according to current country boundaries. Whilst the scales and absolute numbers defy comparison it is the relative proportions that are of interest.

The absolute numbers encountered in each country cannot be compared due to several influences coming into play. Note has already been made of the uneven availability of the coin find information across the area of study. Britain and to a certain degree France are well served with good quality publications, Germany not so in terms of the information required for example. This is possibly due in part to the period when a number of large German hoards were discovered, apparently the late 19th century.

There are other factors which may determine the amount of material available for study and the representativeness of the sample. These are covered in some detail by Bursche, particularly with respect to the "free" territories bordering the Roman Empire and are only treated in summary below²².

Bursche state that the level of coin find registrations in any given area is a combination of several historical factors, which can only be understood by a study of the history of archaeology, numismatics and the laws governing the finds. An example of this is the 1996 Treasure Act in the UK which replaced the old Treasure Trove laws and required a larger cross section of archaeological finds to be reported, including base metal coins if the silver composition of the whole find is greater than 10%. Whether this will mean that more of the third-century base silver radiates will be recorded is yet to be seen but it is a changing circumstance.

The activity of archaeological excavation and the availability of sites for excavation also plays a part in the amount of material discovered, for while most objects may be chance finds deliberate excavation in areas increases the chances of discovery. Another factor which may come into play in urban areas is the amount of rebuilding and regeneration taking place. This again leads to the chance discovery of archaeological remains when foundations are being dug and layers previously sealed are re-exposed.

This idea was again taken up by Edith Wightman, particularly in relation to inscriptional evidence but the underlying principals still apply, particularly with respect to areas with a tradition of antiquarians collecting and preserving ancient artifacts, collections which today form the basis of many museums²³.

Thus the chances of discovery and reporting are not evenly distributed.

The next stage of the analyses involves the definition of temporality in the pattern of coin issues within the western provinces. In order to this a method of detecting trends within coin hoards had to be devised. First of all a definition of date has to be set.

The only secure way of setting a *terminus post quem* for the hoard is by taking the approximate date of issue of the last official coin in the hoard. The official coinage has to be used because as yet there can be no truly secure way of dating the production of local radiates, although this will be addressed in chapter 10 below. As already noted the relative sequence of issues is known, although not the length of the period of issue, and one may make an informed guess then as to the approximate date of issue.

It is acknowledged that the date of the last coin does not necessarily reflect the date the hoard was buried but it is a fixed point. The degree of wear could be used to add a subjective analysis to the date of deposition but there is no way of determining the rate of wear on the coins. A hoard can be compiled in many ways. By that I mean it could be composed by taking a random proportion of coins from circulation over either a short or long period of time, thus there are variations in the degree of wear exhibited. An alternative scenario may be that it could be selected on the basis of new coins all the time, thus none of the coins over the whole period exhibits any degree of wear. It is dangerous to make assumptions over the degree of wear exhibited on the coins as one does not truly know the circumstances of compilation.

A further problem that may be demonstrated by this approach is the agglomeration of hoards with terminal official coin dates of 274AD. This apparent grouping does not demonstrate, for example, that the advancing army of Aurelian and the impending collapse of the Gallic Empire was the cause of unrest leading to the burying of hoards. The lack of post Aurelianic reform (c.274AD) official coinage circulating in Britain and Northern France masks the true deposition date which may be as late as the mid 280's. The presence and module of any locally produced radiate imitations may be a way of determining when exactly a "274" hoard was buried. I will return to this idea in a later chapter.

The next step was to convert the actual number of radiate coins of a particular issue into a percentage of the total number of coins in a hoard.

$$(1) \quad p = 100(x/n)$$

Thus the percentage (p) is the number of radiate coins in an issue (x), divided by the total number of coins in the hoard (n) multiplied by 100. Very few of the hoards analysed contained coins other than antoniniani (pre Aurelianic reform radiate base silver coins) or aureliani (post Aurelianic reform base silver radiates). Where hoards were mixed a decision was taken to include other denominations in the total number of coins within the hoard.

An alternative approach would have been to work out each issue as a proportion of the total value of the hoard, thus equating two denarii to an antoninianus, eight sestertii etc. This would however present problems. As already discussed the relationship of the denarius to the antoninianus is by no means certain, and the relationship of the large bronzes to the debased silver issues again causes problems. This may be demonstrated by Lafaurie who suggests that the large radiate bronze of Postumus, called a double sestertius by many authors, may in fact have been equivalent to a silver antoninianus and was issued as a stop gap during a period of uncertainty of silver supply²⁴.

Next an average percentage was calculated for antoniniani of a given issue, thus:

$$(2) \quad m = 1/a \sum_{i=1}^a p$$

That is to say the percentage of an issue in each hoard (p) was summed and divided by the number of hoards (a) to derive the mean (m).

The next stage was to calculate the difference (d) from the mean of a particular issue in any given hoard:

$$(3) \quad d = p - m$$

Finally the differences were cumulatively summed after ranking the hoards in date order:

$$(4) \quad d + (d + d_1) + (d + d_1 + d_2) + \dots(d + d_1 + \dots d_n)$$

Each iteration of the summing of the difference of the percentage from the mean for any given issue could then be plotted against the date of the last official coin in the hoard. By doing so the "noise" may be eliminated from a graph of percentage composition of an issue in a hoard.

Furthermore the resulting plots allow a determination of any underlying trends to be made much more easily. For example, if the resultant plot is sloping downwards there is an under-representation of the issue at this time when compared to the whole time series. Conversely a rising trend indicates an over-representation as a whole. Horizontal plots do not only reflect no change but also that the overall trend of the hoards in question reflects the grand mean (that is, the statistic m derived above) for the issue. Whether the

plot is rising, falling or level points in a line with one another are recognised as having the same underlying mean.

The plots can have both positive and negative results along the y axis and this may lead to some confusion as the graph may still be in the negative phase, although rising, and indicate an over representation in that part when compared to the overall or grand mean.

The converse is also true for results wholly in the positive phase.

The name applied to the above type of analysis is cusum, an abbreviation of cumulative summation. A fuller description of the mathematics behind cusum analysis may be found in a monograph of the Institute of Statisticians²⁵.

7.1 Cental Empire Radiati

Radiati of the Central Empire are found in hoards of Gallic Empire coins, of that there is no doubt. Is it possible to determine when these coins entered circulation within the Gallic Empire, that is perhaps the more important question? In short we do not know but by looking at their occurrence in hoards with terminal coin dates in the period 260-300AD some light may be thrown on the subject so long as the assumption is made that, all things being equal, if the coins are present in the pool of circulating currency they are just as likely to be picked out when hoards are being assembled. Thus it is only when coins are available for hoarding will they find themselves being incorporated into deposits.

There is one problem and that is that things are not equal between the two regimes in

one important aspect, the value of silver in the coins. The comparative quantity of silver in the coins of the two regimes may be demonstrated using the work of Cope et al²⁶. The results of their analyses, undertaken by several methods, may be summarised as follows:

Table 7.1 Silver content of antoniniani of the Gallic and Central Empires

Date	Average Weight of Silver per Coin	
	Gallic Empire	Central Empire (Rome)
260	0.75g	0.39g
267	0.65g	0.08g
268	0.15g	0.11g
270	0.13g	0.09g
274	0.04g	0.12g

The above table is not only concerned with the proportion of silver in the coinage but also the weight of the coins, thus showing the relative intrinsic worth of the money. It demonstrates that until the fall of the Tetrici the Gallic Empire base silver coinage was better than the Central Empire counterparts from the mint of Rome, although in practice after the monetary reform of Postumus around the year 268 the difference is only marginal and may not have been detectable. In the early years of Postumus the significant difference between the two states would have led to a reluctance to accept the Central Empire coins, or at least a reluctance to keep them, demonstrating Gresham's Law of "bad money driving out good", if the coins were available in the first place. The more favourable coins to keep being the good silver of the Gallic Empire. After 268 the comparison is much more equitable and, at least in theory, the coins could co-exist.

Overall the coins of the sole reign of Gallienus from the mint of Rome exhibit a similar plot when one compares the occurrence of the coins found in Britain, France and Germany. Issues 2 to 3 increase in number before dipping with issue 4 (figures 7.1-4). There is a large increase in issue 5 coins and issue 6 is not far behind.

The relative numbers of coins encountered to some extent reflects the alloy of the coins, the numbers being approximately inversely proportional to the silver content. This may also reflect the numbers of coins originally produced, that is, with debasement the number of coins that may be struck from a pound of silver increases. It is also after issue 4 that the number of officina operating at Rome increases from six to possibly nine at first and then twelve during the course of issue 5^{27,28}. The number of coins in issue 6 one would expect to be greater than issue 5, given the above comments on alloy, however it must be borne in mind that this is the last identified issue from Rome as Gallienus was murdered during its course and thus there is no indication how much longer it may have lasted and secondly there is no account taken of the length of the coin issues. It would be dangerous to assume that the issue periods were all of equal length.

The similarity of the coin pool exhibited in plots of the coin finds of the western provinces is not repeated when one looks at the cusum plots of the coin type against the terminal official coin date in the hoard. In order to extract this information one has to look at specific coin issues. There is still some confusion over which issue to put certain coin types. This is because although the Rome mint was divided into workshops or officina it appears that the production was not limited to one reverse type per officina per issue. Thus in order to reduce the potential for confusion over which reverses belong

to which issues one has to use issue where this is not really in doubt. For Gallienus' sole reign Rome mint issues this means using issues 4, 5 and 6.

The diagnostic feature of using the above three issue for Gallienus are quite distinct. Issue 4 is the last pre debasement issue from the mint. It was struck in the six officina system identified using Roman numerals and utilises exclusively seated reverse types. Issue 5 is the first post debasement issue. It is also the first issue to have its products struck under the twelve officina system which mark their products using Greek numerals up to workshop 9 (A - N) and Roman ones for workshops 10 to 12 (X to XII). The sixth issue is the "animal" series with inscriptions dedicating various gods as CONS AVG. This issue is marked in a similar way to issue 5. For the benefit of this study the issues of Salonina have been included with those of Gallienus.

The issue 4 coins are dated to approximately late 263 through to the end of 264 by Göbl and correspond to his emission 14²⁹.

Comparison of the cusum plots for France, Britain and Germany shows that the coins behave differently in hoards in each of the three countries, although the results may be somewhat distorted as the histogram of issues for each issue by country demonstrates that the issue is not a large one, or rather it does not occur in finds in the western provinces in large numbers compared to the other issues of Gallienus (figures 7.5-7). The downward slope of the plot for France terminates with finds which end with official coins of 270 compared to 273/4 for Britain and Germany. This may be a false impression as there is little or no supporting data for France in the period 271-3. However the first

positive cumulative summation result for France occurs in a hoard which terminates in 270 whereas the first British positive result occurs in a hoard which terminates in 271AD. These dates are very close and, given the low numbers of coins involved, it is difficult to place any significance on this variation. It may, however, be a demonstration of a lag between Britain and continental Europe of a diffuse coin movement.

Similarly the large jump in the plot in the 280's for Britain not in evidence in France and Germany and may be a statistical aberration given that the particular British find in question was only in the order of 100 coins in total.

The issue 4 coins, as the histograms of the issues demonstrate, are relatively scarce in comparison with the other issues of Gallienus. Are the cusum trends of this issue reflected in the more abundant hoard coins of issues 5 and 6?

Examination of the plots demonstrates that there is certainly a difference in the way these issues behave when one compares the occurrence of both issue 5 and issue 6 finds in hoards from Britain and France and within each country the two issues behave similarly (figures 7.8-11).

In Britain issues 5 and 6 begin to occur in hoards in relative numbers significantly greater than the overall mean composition after about 273, however after about 275 the percentage composition of these two issues evens out through to the final deposits around 296 when their relative abundance increases slightly.

In France a different picture emerges. The two issues occur as a significant proportion of coins in hoards terminating after approximately 270AD and their relative abundance rises until around 275. After this there is a steady decline in the relative proportion within hoards until around AD285 indicative hoard date after which they rise again.

The German hoard information is much too sparse to say whether it matches either the British or the French pattern of coinage circulation.

This would seem to be present two notions about Central Empire coin circulation within the western provinces:

1. Central Empire coins do seemingly circulate within the area of the Gallic Empire, particularly in mainland Europe, during the existence of the separatist regime, comments on the absolute dating of the hoards notwithstanding, and
2. The British coin pool becomes "fossilised" in terms of the Central Empire coins. In France, as one may expect with the continued introduction of newer types the relative proportion of the older coin types reduces in the circulating medium, thus there are proportionally less available to hoard.

The first of these two points has been recognised before as Callu is able to demonstrate by comparing the representation in 24 western European hoards the coinage struck after 260 for Postumus and Gallienus. The hoards with a terminal date after 267 exhibit an increase in the absolute number of coins of Gallienus, although there is no indication as

to what proportion of the find is made up of these coins as it is also noticeable that the absolute number of coins of Postumus is also high for three of the six hoards used from 268AD³⁰.

Why France should exhibit an increase in the older Central Empire coins after 285 is unclear. However there are two possible events which may have some bearing.

The first of these is the revolt of Carausius, dated by Casey as occurring during the year 286³¹. If there was an economic isolation of Britain in the years following the suppression of the Gallic Empire leading to a relict coin pool the establishment of official British mints at London and probably Colchester offered the opportunity to recoin the old money. Old hoards would be recovered by their owners for conversion into new money and possibly spent in their old form as well. This explains the slight rise in Central Empire coinage in British hoards at the end of the third century. It does not explain the rise in France over the same period unless there was a reticence on behalf of Diocletian and Maximianus to supply the hinterland of Carausius revolt with new money. There is evidence that Carausius retook the continental possessions initially lost by him³².

The second event is, like the revolt of Carausius, mainly centred on Britain but the effects can be envisaged in the hinterland. That event is merely hinted at in the titles of the official emperors of the time Carus and Carinus. Some time around 284AD both assumed the title of Britannicus Maximus, the result of some otherwise unknown British campaign³³. Carinus was appointed Governor of Gaul by Carus and Britain was probably under this jurisdiction. The campaign alluded to may have been to quell a local rebellion,

however the production of local radiates also appears to cease around this time, along with the deposition of a number of coiner's stashes that appear to be deposited from this period which have been deposited, for example Coygan Camp, Meare Heath and Sprotbrough the two events may be connected^{34,35,36}.

What is certainly known is that military activity affects the availability of new coin within an area. Reece's diagram, reproduced in chapter 6, clearly shows that the impetus for new gold and silver coins was the functioning of the state on a local level. Thus the movement of an army into or out of an area has an impact on the coins in circulation.

It should also be remembered that what is reflected in the cusum graphs is what is being hoarded, not necessarily what is being allowed to circulate. This may seem a little at odds for in order to come across coins to hoard surely they must be circulating but the hoarding activity is removing the coins from circulation. One may view the French cusum plots of issues 5 and 6 as a reluctance to hoard the old coins of the Central Empire in the light of the newer issues and the line from Zosimus which talks of buying in the old money which has been speculated upon that it was bought in at a lower rate of exchange, thus making it unacceptable to hoard³⁷. The lack of the post Aurelianic reform coins reaching Britain produces a different behaviour where any coin is considered acceptable.

As well as Rome the mint of Milan was also active in the west during the reign of Gallienus. The arrangement of these radiate issues during his sole reign are not as easy those of Rome to tease out into coherent groups, especially when dealing with the older

reports. Göbl's arrangement has been somewhat superseded and I therefore decided to aggregate the hoard data on the grounds of the mintmark which showed progressive changes³⁸. Thus I split the issues into three groups;

1. the legionary reverses,
2. the coins marked with officina letter only,
3. the coins marked with both officina letter and mint initial.

These groupings coincide with the issues 1, 2 through to 6 and 7 to 8 respectively, cited in the Cunetio and Normanby hoard volumes. Although the appropriate volume of Roman Imperial Coinage places the legionary issues as being late in the joint reign with his father both Göbl and King place them as early in the sole reign of Gallienus^{39,40}.

Comparison of the Milan mint coins of Gallienus' last two issues with those of Rome shows the behaviour to be very similar with respect to Britain, with some presence 269 to 272 but with relative abundance increasing 273 to 282 followed by a steady phase (figure 7.12).

The picture for France however is different. There appears to be a sudden influx of Milan mint coins in hoards deposited around 270 which continues through to 274, just as the Rome mint coins do (figure 7.13). There is then a post 275 decline but no resurgence in the proportion of Milan coins in hoards deposited after 285.

The Rome mint issues under Claudius II may be determined on the basis of the obverse legend characteristics and the reverse type and may be broadly split into four groups.

The first issue is not widely encountered and may be recognised as having the legends IMP C M AVR CLAVDIVS PF AVG or IMP CLAVDIVS PF AVG. The reverse types overlap with the second issue and was probably very short lived as within the study only five were encountered out of a total of nearly twenty thousand Rome mint coins of Claudius. For this reason spatial studies on this issue are not practical.

The second issue has the obverse legend IMP C CLAVDIVS AVG and reverse types dedicated to each of the twelve officina. In addition to this are a series of coins which do not conform to the twelve assigned reverses and are unmarked. Some authors include these coins in the first issue but others, including Bland and Burnett, put them in the second issue. They probably mark some kind of transitional type and I too have chosen to include them in the statistics of the second issue on the basis of their obverse legend.

The third issue at Rome uses the same twelve officina dedicated reverses but the obverse legend is now IMP CLAVDIVS AVG. The condition of many hoard coins from this period frequently precludes differentiation between issues 2 and 3. On the understanding that one is equally unlikely to be unable to read a second issue coin as a third issue coin I have chosen to omit the uncertain coins from this study. If one is correct about the chances of illegibility this should not affect the distribution of the coins one can read with certainty, nor the relative abundance of these two issues to each other.

The fourth Rome issue continues with the obverse legend IMP CLAVDIVS AVG but now has a new series of reverses dedicated to each officina. These reverses continue through into the reign of Quintillus and also for the first issue of Aurelian from Rome. The deified coins of Claudius are considered below.

With regard to their occurrence in hoards over the period 260 to 320 there is a similarity in the behaviour of issues 2 and 3 when comparing Britain and France (figures 7.14-19). For both issues there is a period after their issue when these coins are under represented in hoards in both countries, although in the case of issue 2 in France their increasing abundance in hoards is apparently around 270AD, a little before Britain. Their relative numbers in hoards then decreases from 275 through to 285 before rising again at the end of the century.

The Rome mint coins of Claudius thus behave differently in British hoards than their Gallienic counterparts. That this should be so I find difficult to explain. The issues, particularly the debased fifth and sixth ones of Gallienus do not differ significantly in alloy from those of Claudius in order to make one preferable over the other.

That the earliest significant issues of Claudius (if one disregards the first issue as being insignificant) are available to hoard early on is feasible. Claudius was implicated in the murder of Gallienus following the siege of Aureolus at Milan^{41,42}. Thus, during the early part of his reign he was in the vicinity and fighting a usurper who openly supported the Gallic Empire and therefore required an early influx of money into the area in order to pay his troops and ensure their continuing support. This would also help to secure his

western flank before moving east to face the Goths in the Balkans but also provide money for use in trade across the notional border⁴³.

The inscriptional evidence compiled in chapter 4 above demonstrates that in southern France to the outskirts of Lyon inscriptions are recorded indicating support for Claudius right through his reign from his first tribunician and consulship (268/9) through to his third tribunician and second consulship (270)⁴⁴. The Milan issues of Claudius of all three issues arrive in French hoards around the same period rather than having the delay to 273-4 as experienced by British hoards (figures 7.20-25). This also parallels the Rome issues of Gallienus.

Claudius II died of the plague after securing a substantial victory over the Goths and was succeeded by his less able brother, Quintillus, although there was to be a successful challenge from the Balkan legions who supported Aurelian⁴⁵. The coins of Quintillus are relatively easy to arrange as the western mints of Rome and Milan only appear to have made a single issue of radiates. The Rome mint utilised the last series of twelve reverses as issued by Claudius with the exception of the fourth officina which replaced the dated reverse of Claudius with CONCORDIA AVG. The Milan mint issued a new series of reverses, MARTI PACI, FIDES MILIT and CONCORD EXER at officinae P, S and T respectively although mules with Claudian reverses do occur, for example Normanby 1220, DIANA LVCIF, a reverse of Claudius' last issue⁴⁶.

A large series of coins honouring the memory of Claudius also occur at Rome, Milan, Siscia and Serdica. The authority responsible for this series of coins and their date of

issues is still not satisfactorily explained. On the one hand it is thought that the coins were struck by Quintillus in memory of his brother, perhaps as much to emphasize his right to the imperial throne as out of respect. Alternatively Aurelian has been suggested as being responsible. Bland and Burnett publish a number of specimens which are either overstruck on the coins of Aurelian, for example a Cyzicus mint example on which can be read P [C] DOM AV on the reverse, or, alternatively, muled examples such as those from the Rome mint which pair the obverse of Aurelian with a Claudian posthumous reverse⁴⁷. Further evidence is suggested by the metallurgical analysis of the DIVO CLAVDIO issues as undertaken by Cope et al and also by looking at the weight of specimens in the Venera hoard^{48,49}. The statistical analysis of the weight of the specimens in the Venera hoard suggest that the population of coins of DIVO CLAVDIO type has more in common with the earliest issues of Aurelian than with those of Quintillus, for the Rome mint at least.

The hoard evidence which I have assembled for Britain and France also suggest that the coins of Quintillus and those of the deified Claudius behave differently to each other and that there is also a difference in this behaviour between Britain and France (figure 7.26-7).

In Britain both the deified coins of Claudius and the radiates of Quintillus occur in hoards at similar levels through to hoards deposited in 274. In post 274 deposits there is a marked decline in the proportion of coins of Quintillus, whereas the coins of the deified Claudius maintain a level of frequency. In France quite the opposite is true, it is the coins of Quintillus that maintain a level of frequency within hoard deposits.

This may not necessarily reflect a difference in the circulation of the coins and hoarding patterns but rather the attitude of the numismatists working on the coins. It is seldom that numismatists from mainland Europe get to classify a British hoard and vice versa. Continental numismatists have, in the past, been more ready to separately list a class of mid third century radiates of acceptable style yet with what Bland and Burnett describe as "poor fabric", the fraudulent Rome mint issues, whereas British workers incorporate them into the main corpus of the hoard⁵⁰. This gives rise to three potential anomalies with data collection.

The first of these is that there may be an over acceptance of Gallic copies of good style into the main body of the deified coinage of Claudius within British reports. Secondly the class of coins of poor quality, identified as being fraudulent Rome mint copies, goes unrecorded in Britain. Thirdly there may be an under representation of the deified coins of Claudius in continental reports. This difference in identification would give rise to the differences observed in the cusum plots between British and French hoards.

Alternatively, if the plots of the DIVO CLAVDIO coins are a true reflection of the hoarding of official coins, the abundance in British hoards in the period after the collapse of the Gallic Empire would explain why it is such a popular prototype for the local radiate copies of the Central Empire issues.

The coinage of Aurelian is not frequently encountered in Western coin hoards when compared to the coins of the previous Central emperors discussed. Indeed when one looks at the average composition of Gallic hoards which could contain Aurelianic coins,

that is hoards with terminal dates post 270AD, the pre Aurelianic reform Rome mint coins from the UK, France and Germany form 0.09%, 0.23% and 0.09% of the total respectively. If one compares this with the fifth sole reign issue of Gallienus the proportions are in the region of 4.26%, 7.69%, 5.19%, yet there should not be any differential hoarding with respect to alloy composition. Thus one may assume that the Aurelianic coins are scarcer in hoards because there were fewer in circulation that are available to hoard. The post reform "XXI" coins are scarcer still with none being encountered in the tabulated German finds.

One other surprising feature from this period is the scarcity of coins from the Lyon mint which was operating for Aurelian following the reform. The coins are not encountered in hoards at a frequency that would allow analysis to be meaningfully undertaken.

Comparison of the pre and post reform Rome mint plots from Britain and France show two distinct patterns of coin hoard behaviour (figures 7.28-31). In France both pre and post reform coins are not frequently encountered in hoards until hoards with terminal coin dates post 284AD when the number jumps to reflect the overall mean composition.

In Britain the pattern is different both when compared to France but also when one compares the occurrence of pre and post reform Rome mint coins within British hoards. The pre reform coins are not encountered at mean levels, that is the cusum plot is horizontal, until 284, just as occurs in French hoards. This continues to post 290AD. In hoards deposited after 290 the pre reform coins are over represented, that is occur in proportions greater than their overall mean. With the post reform coins their occurrence

in hoards is scarce until 282 after which they are overrepresented until post 290AD after which their numbers begin to decline again.

Post early 280's again appears to be a turning point, both in France and particularly in Britain. There appears to be an influx of Aurelianic coins in hoards which may reflect a supply of coins to the area with the movement of an army to crush a British revolt such as under an un-named Governor of the island during the reign of Probus or a campaign to give Carinus his title Britannicus⁵¹. It would explain the occurrence of the post reform Aurelianic coins in France and Britain and the non appearance in Germany to some extent although how would one then reconcile the non appearance of post reform Aurelianic coins in German hoards of the 280's, especially as Probus issued a coin type with the reverse VICTORIA GERM (RIC 141-2 aureii, 217-23 radiati, 254-9 denarii, 268-9 and 272-8 quinarii, 299 asses) signifying a successful outcome to German campaigns. One explanation of this may be due to the systematic nature of Roman coin supply to provinces and the troops involved in the German campaigns during the reign of Probus may be from provinces not initially supplied with coins of Aurelian, ie troops from legions/units within the Gallic Empire, thus any Aurelianic coins within the coin pool are due to passive movement. When this is combined with the poor survey data obtained from Germany the result is no post reform Aurelianic coins from the area.

7.2 Radiati of Postumus

The coins of the first Gallic Emperor, Postumus, are perhaps best seen as a continuation of the Central Empire coins and the initial issues even use a portrait reminiscent of Gallienus. As discussed in Chapter 5 on the Gallic mints the sequence of issues is well

established, although the actual dates of issues are perhaps less certain. For the basis of this study I am using the dates proposed by Besly and Bland in the *Cunetio* report which also fit the proposed start and end dates of Postumus also discussed above⁵². What is immediately apparent from the collected data is that the survival of coins, when comparing the different issues, is very uneven, just as it was for the Rome mint coins of Gallienus (figures 7.32-37). Again one must not make assumptions that the survival rate reflects either the period over which the coins were issued nor inferences about the initial production volumes.

When comparing the survival of coins by issue of Postumus with those of Gallienus from the mint of Rome other distinctions are visible. The coinage of Gallienus is most abundant after the significant debasement that followed issue 4. This is so by a large margin. This is not the case with the coins of Postumus. The most abundant surviving coins are from the first and third issues from the primary mint, issues that were of good silver for the period in question. The later issues are never anywhere near as common. There is a slight parallel with the coinage of Gallienus in that Postumus' coins of issue 6 from Mint 1 are more abundant than those of issue 5. That is, the coins with reverses PAX AVG (standing Pax) and ORIENS AVG both with a letter P in the reverse field are more abundant than those without. Thus, the debasement appears to have been linked to increased output, if the numbers surviving are an accurate reflection of production.

The occurrence of the radiates from Mint 1 of Postumus in British hoards may be divided into three distinct patterns according to the issue (figures 7.38-44). The earliest

coins, issue 1, show that between 260 and 273 their occurrence in British hoards was greater than the overall mean. There was also no perceptible lag between issue and the appearance of the coins in British hoards. After 273 there is something of a drop in the coins which continues through to around 274-5. The drop begins again in the hoards with terminal official coin dates from 279 through to the early 280's. After c.284 there is a slowing of the removal of the coins, demonstrated by the angle of the cusum plot becoming less steep downwards. This may be indicative of the movement of some post Aurelianic reform radiates into Britain and the suppression of the local radiate production. The earlier good silver coins of Postumus would not be as grossly overvalued in relation to the current radiate coins of the Roman empire.

Issues 2, 3 and 4 appear to demonstrate some lag prior to their appearance in British hoards until c.266-7. Some of this may be explained by the known and assumed history of the period. For example Drinkwater suggests that the NEPTVNO REDVCI reverse type, known for both gold and silver issues and placed by Besly and Bland in the second issue, records a return of Postumus from a journey across the sea, the implication being that there was a visit to Britain^{53,54}. There is no literary evidence recording such a visit but there would be a strategic importance in making a visit, along with an injection of money, to try and secure the loyalty of the British legions in order to protect one's rear. In subsequent years the army of Postumus was engaged in defending Gaul from the Germanic tribes to the east of the Rhine and from the army of Gallienus and as precious metal coinage was essentially a method of ensuring that military and state needs were met payment would be directed to where the army was, particularly on active service in the first place.

All the British cusum plots of Mint 1 radiates of Postumus peak in hoards with terminal official coin dates c.273.

There are two issues from the second mint of Postumus, the first of which probably coincides with issue 6 from the primary mint and the second which is probably linked to the beginning of the seventh but which is interrupted by the revolt of Laelianus. That this second issue is short is demonstrated by their relative rarity. I am only able to record 24 examples from British finds (both sites and hoards) out of a total of 25,076 antoniniani of Postumus. It is thus impossible to perform a meaningful cusum analysis on this issue.

The first issue from the second mint is present in sufficient numbers to allow a cusum plot to be generated (figure 7.45). While there are some similarities with the plot for Britain with issue 6 from the main mint, particularly in the 273 cusum peak and subsequent tail off there is a definite negative phase prior to 271 indicating that lower levels than the overall mean are experienced in hoards between 268 and 271.

The third mint to strike antoniniani in the name of Postumus, Milan, demonstrates a different pattern altogether (figure 7.46). These do not appear to register in British hoards in significant numbers until after the post 274 watershed, suggesting that the movement of these coins to Britain was different to the truly Gallic coins of Postumus but also behave differently to the Milan coins of Gallienus. There are similarities with the Milan coinage of Claudius II.

When one looks at the overall relationship between the issues and compare France,

Britain, Belgium, Spain and an amalgamation of Germany, Luxembourg and Austria it is surprising how different the plots are (figure 7.33-37). Absolute numbers notwithstanding issues which are, say, relatively uncommon in Britain and France may for the greatest proportion of coins recorded in another area, for example taking the fourth issue in the case of Belgian finds. The abundance of issue 4 from Belgian and German finds, an issue dated to approximately 266-7, coincides with significant hoarding activity in that vicinity⁵⁵. The hoards described by Gricourt consist not only of silver radiates terminating around 267-8 but also hoards of bronze sestertii of Postumus, terminating with types from Bastien's Atelier II of a module (21mm diameter) which would place their manufacture to post 265. There are no coins of later Gallic Emperors nor any of Claudius II or later. Curiously enough though there are coins of Gallienus of Rome mint issues 5 and 6 which would again point to a date of 267-8AD. It is suggested by Gricourt that what is in evidence here is a state of unrest following raids by seaborne pirates, especially as many of the hoards are located by navigable rivers, but it may also be used to demonstrate co-circulation of Gallic and Central Empire coins.

Furthermore Gricourt claims that the political events, the victory over the Germanic pirates and also a victory over Gallienus (or at least the defection of Aureolus, a senior officer of Gallienus) are reflected in the later gold and base silver coin types of Postumus, contrasting, for example, the REST(ITVTOR) ORBIS and the REST(ITVTOR) GALLIAR(VM) reverse types on the radiates, one reflecting wider issues, the other more local ones⁵⁶.

One must accept with reserve the invasion theory as a mechanism for the abandonment

of coin hoards and any associated destruction layers that are encountered within excavations as the two events are not necessarily linked. Only in recent years has a similar theory of coin hoard distribution and urban decline based on Frankish and Germanic invasions in the 260's and 270's on the Iberian peninsular begun to be questioned⁵⁷. When the facts have been examined few positive cause and effect links have been established in that region, particularly for the second wave of attacks in the 270's.

Throughout France as a whole the cusum plots are similar to those from Britain however some differences are apparent and may be summarised as follows (figures 7.47-55).

The left hand side of the plots, particularly of Mint 1 issues 2 through to 4, exhibit no lag, unlike the British plots. That is, the plot of each issue in French hoards rises earlier than British ones. The French hoards are represented by larger proportions of each issue earlier than the British deposits. For this to be so irrespective of the actual numbers of coins of each type involved must be an indication of transportation and distribution time and the difference between joined to continental Europe and being an island separated by sea.

Another thing that is apparent is that following an initial drop in the proportions of the types, again particularly the earlier, good silver issues (ie pre issue 5), in the period 273-4 common to both countries there is a period 274-280 when there is an intermediate step in the proportions being hoarded in Britain followed by another step post 282. This

intermediate step is not evident in the French plot. It again points to some form of isolation of the British coin pool.

It is worth reiterating that a drop in the cusum plot does not necessarily reflect fewer numbers of coins of a type actually circulating. The plots are derived from the proportion of any particular type within a hoard. Obviously the coins must be available to hoard but a drop in the plot could be caused by the coin pool of an area being overrun by a new type, thus diluting the proportion of other types as well as a type becoming scarce through earlier removal. If, as suggested above that in Britain no new money was imported then in order to continue with economic life older coins would circulate longer, perhaps reintroducing coins from savings or recovered hoards, thus keeping older coins in the "pool".

Unlike Britain the products of the Milan mint in the name of Postumus begin to appear in hoards from 267 onwards, that is soon after their manufacture and in somewhat significant numbers from 270 onwards. In Britain their appearance begins c.267 although it is not until 274 that their proportion increases. Once again there are parallels with the coins of Claudius II. His first issue from the Milan mint is also evident in some numbers in French hoards from 270 although his subsequent issues are not. This may be further evidence of a fluid border between the Central and Gallic Empire.

If one looks regionally at the distribution of Milan mint coins in France of Claudius II and Postumus in hoards with terminal coin dates 268-70, in particular hoards from the south east one is struck by how few hoards from this region actually contribute to the

plots (table 7.2a-b). For Postumus only four out of a total of fourteen hoards are from this area and of those only two had Milan mint coins in his name. For Claudius there are two hoards out of ten and only one had Milan coins. By taking this regional approach one can also demonstrate that Milan mint coins occur in departments in the north west of France, the opposite corner of the country to their probable point of entry.

That said however there is a hoard from the south east of France which probable does deserve some special attention and that is the one from Brézins (Isère)⁵⁸. Brézins is located approximately midway between Grenoble and Lyon. This hoard of 1918 coins which terminated with two coins of Victorinus from the second issue from the primary mint contains 705 sole reign antoniniani of Gallienus with Salonina of which 228 were from the Milan mint. There were 973 radiates of Claudius II, 454 from Milan and 196 coins of Postumus with 93 from Milan. Furthermore there was a high degree of observed die linkage in the Milan mint coins, suggesting very little mixing after their issue from the mint.

Also recorded from this vicinity are two inscriptions naming Claudius II, the first, from Grenoble, being the one that names Claudius' prefect Julius Placidianus and is dated to the second tribunician power of Claudius (my list Claudius 2, König 72, CIL XII 2228). The other inscription from Vienne is dated slightly later to the third tribunician power of Claudius (König 74, CIL XII 5511). There can be little doubt that the bulk of the hoard was put together in an area under the control of the Central Empire, whether it was close to the find spot or imported from another area, from Milan for example. The

DEPARTMENT	REGION	HOARD	DATE LAST COIN	Total no. of coins in hoard	% milan
YVELINES	NE	CRAVENT	268	4401	0.02
SARTHE	NW	ALLONNES	268	1016	0
PAS DE CALAIS	NE	ETAPLES	269	3791	0
ISERE	SE	BREZINS	270	1918	4.85
MAYENNE	NW	COURCITE	270	3285	0
DROME	SE	CHATEAUNEUF-DE-MAZENC	270	142	1.41
VAL DE MARNE	NE	BONNEUIL	270	1759	1.48
LOIRET	NE	CHILLEURS	270	129	0
LOIRE INFERIEURE	SE	TREFFIEUX 1&2	270	594	0
SEINE INFERIEURE	NW	TOTES	270	1379	0.29
YONNE	NE	MALICORNE	270	1050	1.62
CANTAL	SE	MOUSSAGES	270	16	0
ESSONNE	NE	LIMOURS	270	510	0.78

Table 7.2a Milan mint coins of Postumus in French hoards by region

DEPARTMENT	REGION	HOARD	DATE OF LAST COIN	Total no. of coins in hoard	Claudius II Milan 1 (%)	Claudius II Milan 2 (%)	Claudius II Milan 3 (%)	Quintillus Milan (%)
SARTHE	NW	ALLONES (SARTHE)	268	1016	0	0	0	0
PAS DE CALAIS	NE	ETAPLES (PAS DE CALAIS)	269	3791	0	0	0	0
MAYENNE	NW	COURCITE (MAYENNE)	270	3258	0.03	0	0	0
LOIRET	NE	CHILLEURS-AU-BOIS (LOIRET)	270	129	0	0	0	0
ISERE	SE	BREZINS (ISERE)	270	1918	21.06	2.61	0	0
CANTAL	SE	MOSSAGES (CANTAL)	270	16	0	0	0	0
VAL DE MARNE	NE	BONNEUIL-SUR-MARNE	270	1759	1.25	0.23	0	0
YONNE	NE	MALICORNE	270	1050	1.52	0.76	0	0
LOIRE INFERIEURE	SE	TREFFIEUX (LOIRE-ATLANTIQUE), Part 1	270	550	1.64	1.64	0.18	0
LOIRE INFERIEURE	SE	TREFFIEUX (LOIRE-ATLANTIQUE), Part 2	270	44	0	2.27	0	0

Table 7.2b Milan mint coins of Claudius II and Quintillus in French hoards by region

exact chronology of the latest coins in the hoard is difficult to establish as the issue 2 Milan of Claudius and the two coins of Victorinus are probably just about contemporary.

7.3 Radiati of Victorinus

Once again the successive issues of antoniniani are known to have survived today in different frequencies and in differing proportions in different countries (figures 7.56-65). These differences not only reflect supply but also dates of supply of coinage.

The radiate hoards of Victorinus from Britain demonstrate an overall uniformity with respect to the cusum plots and the date the issues appear in them (figures 7.66-73). Mint 1 (Trier) issues 1,3 and 5 and Mint 2 (Cologne) issues 2,3 and 5 are under represented in hoards until 272-3 after which they rise to a peak in 275 and then tail off again. Issue 4 coins from both mints are relatively scarce and generally comprise of the VICTORIA AVG type at both mints. This uniform reverse type and the differentiation of mints by bust type (Trier utilising a draped and cuirassed bust and Cologne a cuirassed bust has meant that there is uncertainty in some older hoard records. I have therefore chosen not to plot this issue.

There are two exceptions to the stated pattern of hoard behaviour in Britain. These concern the second issue from Mint 1 (Trier) and the first issue from Mint 2 (Cologne). The second issue from Trier demonstrates an inverse pattern of occurrence during the period 270-5 compared to the other issues of Victorinus from that mint. That is to say there is a relative over abundance in hoards of that seemingly terminate in 272AD and a strong under representation 273-5.

The issue 1 coins from Cologne peak in hoards deposited in 270 and thereafter there is a general under representation of this issue.

With regard to French hoards once again the general pattern is once again very similar between the issues but behaviour is different to that observed in British finds (figure 7.74- 81). The coins begin to occur in hoards with a slightly earlier terminus, 269 as opposed to 270 which probably reflects the fact that Britain is an island and therefore unless there is a deliberate governmental movement of money diffusion takes time. The peak concentration of issues from both mints is also not as pronounced as in British hoards with a peak as late as 285 being observed for the coins of issue 3 from both mints. Issue 3 coins from the Trier mint by far make up the largest issue of coins encountered of Victorinus in the western provinces.

This late peak suggests that the money of the Gallic emperors was not immediately driven out of circulation. This must then make us question the passage in Zosimus which speaks of making arrangements to "buy in the old money and issue new" in the context of the Aurelianic reforms of the base silver coinage. The suggestion that this refers to the moneyers revolt at Rome and/or the fraudulent coin production from that mint at the time may, after all, be appropriate and that the Gallic and pre reform coins in general were not the old money being referred to, especially as the new coins are not frequently encountered in Gallic contexts⁵⁹.

It is not possible to discuss the Gallic Empire coin hoards of Victorinus without making at least a passing reference to hoards which have a "double terminus" ending with coins

of the Gallic Emperor Victorinus and the Central Emperor Aurelian. These hoards would seemingly go against any notion of a closed border between the two states if the terminal coin dates are to be believed. A number of such hoards have been compiled by Sylviane Estiot and are reproduced in table 7.3⁶⁰.

The classification as to what is or is not a normal hoard is done on the basis of the ratio of the issues of the coins of Victorinus present in the hoard after compiling the statistics from twenty-four hoards tabulated in the Cunetio report and also whether the terminus was later for the Central or Gallic issues.

There does appear to be some temporal trend to the groupings. In particular the group classified as generally normal but with some coin selection tend to terminate mid to late 271 with coins of Victorinus and to autumn 270 with Central Empire radiates.

By examining the spatial distribution of these hoards one is immediately struck by the fact that all these are hoards not from the south east of France, the nearest point of contact with the Roman Empire, but generally from north east and north west France. There is thus the implication of a slackening of any cross border controls between the two regimes between 269 and 271. This may be the case as we know from inscriptional evidence for the presence of soldiers supporting Claudius II from southern France from early on in his reign. The paper does not, however, comment on the statistical significance, nor the actual number of Central Empire coins involved. The termini quoted could be the result of a single coin of a particular issue. Whilst in a find of a handful of coins this would be a large proportion, a single coin in, say, 20,000 is insignificant. The

Hoard Type	Hoard	Galic Terminus	Central Terminus	
Normal	Courcité (Mayenne)	270	early 269	
	Chillers-aux-Bois (Loiret)	early 271	early 269	
	Bonneuil-sur-Marne (Val-de-Marne)	270	269	
	La Cambe (Calvados)	autumn 271	270	
	Luton (Bedfordshire)	autumn 271	270	
	Cuiry-Housse (Aisne)	autumn 271	autumn 270	
	Treffieux (Loire-Atlantique)	mid 271	early 270	
	Choseley Farm II (Norfolk)	mid 271	autumn 270	
	Selsey (Sussex)	mid 271	autumn 270	
	Malicorne (Yonne)	mid 271	autumn 270	
Generally normal though with some selection of coins hoarded	Orscholtz (Saarland)	end 271	autumn 270	
	Somme-Yèvre (Marne)	end 271	autumn 270	
	Bourg-Blanc (Finistere)	end 271?		
	Salperwick (Pas-de-Calais)	?	?	
	Douvres (Calvados)	mid 271	mid 271	
	Totes (Seine-Maritime)	270	autumn 270	
	Porcheux (Oise)	?	?	
	Abnormal			

Table 7.3 Gallic "double terminus" coin hoards

cusum plots of the coins of Claudius II demonstrate that in France only the first issue from Rome and Milan are in the "positive phase" of the graph by 270AD.

Thus I feel that Estiot's paper may paint a somewhat misleading picture by just considering the terminal date without considering the coin population as a whole, although there is evidence noted above for the co-circulation of coins of the two regimes.

7.4 Radiati of the Tetrici

The base silver coinage of Tetricus I and II causes some problems in terms of the arrangement, identification and method of data handling.

The problem over the arrangement of the coins is mainly how to deal with the HILARITAS AVGG reverse of Tetricus I which should be ascribed to the second mint if one notes the cuirassed bust on the obverse and dominant legend IMP TETRICVS PF AVG, although the contemporary gold issue with this reverse is ascribed to Mint 1. Similarly the two types of SALVS AVGG reverse from the same period, one with the legend break after the word SALVS which is combined predominantly with the draped and cuirassed bust of Tetricus I with the legend IMP C TETRICVS PF AVG, whilst the other type has the legend break SALV_S and occurs mainly with the cuirassed bust of Tetricus I and legend IMP TETRICVS PF AVG on the obverse. I have followed the arrangement of the Normanby hoard where the HILARITAS AVGG and SALVS AVGG coins are all the products of the same mint, a decision that the authors base in part on the frequency of "cross-mint hybrid" types, arguing that there was some

consolidation of minting operations towards the end of the reign of Tetricus when these coins were produced⁶¹.

By accounting for the coins in this way a wider source of data becomes available, particularly when dealing with the SALVS AVGG types when the differentiation between the varieties has not been made in older reports.

When dealing with the hoard coins of Tetricus I, coins which are often poorly struck or preserved a significant number of coins with the figure of Laetitia on the reverse are unable to be ascribed with certainty to a particular issue. Coins with the reverse LAETITIA AVG N are from the fifth issue of the second mint whilst coins with the reverse LAETITIA AVGG are from the sixth. A separate record has been made of the coins which are indeterminable due the diagnostic part of the legend being unclear or off the flan. Whilst one may not use this data to apportion the number of unclear coins to issues five and six, either by splitting them 50:50 or pro-rata as this may skew the results unfairly, it does allow a statistic to be derived for issues five and six combined.

Finally one is faced with the question of how to handle the coins of Tetricus II, either combine the issues of his into his father's to paint a picture of mint supply as a whole or handle them separately as a ruler in his own right. I have chosen not to make either assumption and plot both.

Once again one is faced with quite markedly different numbers remaining from the different issues of the two mints and, as noted elsewhere, this may not be used to

necessarily infer length of production, but may reflect other factors such as regional preferences in supply, coinage recall/restriking or preferential hoarding (figures 7.82-91).

The British hoards containing Mint 1 coins of Tetricus I and II display two distinct cusum plots depending on which issues are being considered (figures 7.92-98). Issues 2, 3 and 4 do seem to occur in hoards with terminal coin dates during the reign of Tetricus, whereas significant numbers of issue 5, along with the issue 4 coins of Tetricus II do not occur in any great numbers until after the fall of the Tetrici. The inclusion or not of the coins of Tetricus II does not affect the distribution of the cusum plot as when considered as an individual the coins of this caesar follow a similar to his father in hoards.

The Mint 2 coins present a similar pattern, although the break between the two types of plot occurs between issues 5 and 6 (figures 7.99-105).

That this break occurs between issue 5 and 6 at Mint 2 and between issues 4 and 5 at Mint 1 does not necessarily mean that the change occurred at a different time, only that the recognised issue periods are of different length. Indeed, the issue regarded as the first from Mint 2, that is, with the obverse type of IMP C G P ESVVIVS TETRICVS AVG, radiate, draped and cuirassed bust right combined with the reverse type of FIDES MILITVM, Fides standing left holding two standards, may well be an example of a cross mint hybrid as I have only been able to find three examples out of over 86,000 coins of Tetricus I with recorded find spots (2 from the Normanby hoard, number 1502/1 and 1502/2; and 1 from the Blackmoor hoard number 15267A). A note to the

listing in the Normanby report identifies the two coins as being obverse and reverse die duplicates of a specimen recorded in the British Museum, number R1147, although whether this is the Blackmoor specimen is unclear^{62,63}. A specimen of the type is illustrated on plate 23 of Schulzki's book and also in *Roman Coins and their Values* and these too appear to be from the same obverse die^{64,65}. I have not been able to perform cusum analysis on such a limited number of coins.

The French deposits of Tetricus I and II are all from hoards post 274 in date the cusum plots follow similar patterns when considering the issues. Taking the mint 1 coins, there is a rapid rise in over representation in deposits with official coin dates from 274AD (figures 7.106-112). There is then something of a dip through to 279 followed by a rise again through to 283 followed by another decline. All that varies is the degree of directional change, for example, the dip with the issue 2 coins is by far the greatest.

The Mint 2 coins again follow a similar pattern, although with the second issue the similarity is perhaps stretched to the limit (figures 7.113-119).

7.5 Statistical Significance

The cusum plots provide a clear picture of the occurrence of particular coin types within western hoards during the mid to late third century AD but how confident can we be that the observed "hinges" where the plots change direction are a manifestation of a change rather than a random variation? There is within cusum analysis a methodology for testing this with the application of a spans test⁶⁶.

In order to do this the standard error, σ_e , must be calculated. The calculation may be expressed as:

$$(5) \quad \sigma_e = \sigma / \sqrt{a}$$

where σ is the standard deviation and a is the number of hoards.

The next stage is to identify from the cusum plots which are plotted against the overall mean, the $y=0$ line, segments where the local mean changes. This may be identified by a change in slope between two adjacent segments of the graph. If the two ends of the segments under scrutiny are joined by a straight line the greatest vertical distance may be determined. This figure is V_{\max} . The span test statistic is determined thus:

$$(6) \quad V_{\max} / \sigma_e$$

This value may then be tested against the critical value for statistical significance using the appropriate criterion for a span, that is, the number of observations in both segments under test, of length c .

Table 7.4 Significance matrix for the span test on cusum plots

Critical values of V_{\max}/σ_e for span tests

span, c	significance probability, %					
	5	2.5	1	0.5	0.25	0.1
10	3.8	4.2	4.7	5.0	5.2	5.5
20	5.5	6.0	6.7	7.2	7.6	8.0
30	6.8	7.5	8.3	8.8	9.4	9.9
50	9.0	9.7	10.8	11.4	12.1	12.9
100	12.8	14.0	15.6	16.7	17.8	18.9

If more than one span test is to be performed on a data set or series of length N, then the critical value should be modified by:

$$(7) \quad c/N$$

The standard error, σ_e , was calculated for all the data sets which were subjected to cusum analysis. Time did not permit the calculation of significance for all the recorded cusum "hinges" but a number were done on the Central Empire issues to give a feeling of the levels of significance encountered and these are appended in table 7.5. Broadly speaking the changes identified are statistically significant around the 99.75% to 99.9% levels. That is, there is a definite degree of certainty that the observed changes are real.

Although this does not allow us to say why they are different it does allow us to recognise that:

Table 7.5 Statistical significance of a sample of the observed data "hinges"

COUNTRY	RULER	ISSUE	DATE OF HINGE	σ_e	SPAN (c)	V_{max}/σ_e	SIGNIFICANCE (approx)
Britain	Gallienus	Rome 4	271	0.08	17	14.82	ns
Britain	Gallienus	Rome 4	273/4	0.08	32	14.34	99.5%
Britain	Gallienus	Rome 4	284	0.08	34	31.51	99.9%
Britain	Gallienus	Rome 5	271	0.45	25	61.5	99.9%
Britain	Gallienus	Rome 5	274	0.45	41	50.91	99.9%
Britain	Gallienus	Rome 6	271	0.33	24	69.97	99.9%
Britain	Gallienus	Rome 6	274	0.33	41	62.01	99.9%
Britain	Gallienus	Milan 7/8	271	0.09	33	33.09	99.9%
Britain	Gallienus	Milan 7/8	282	0.09	39	33.09	99.9%
Britain	Claudius II	Rome 2	271	0.41	19	47.77	99.9%
Britain	Claudius II	Rome 2	274	0.41	33	46.28	99.9%
Britain	Claudius II	Rome 2	282	0.41	32	14.93	99.75%
Britain	Claudius II	Rome 3	271	0.23	22	29.95	99.9%
Britain	Claudius II	Rome 3	274	0.23	36	21.74	99.9%
Britain	Claudius II	Rome 3	290	0.23	33	30.43	99.9%
Britian	Claudius II	Milan 1	271	0.08	21	56.58	99.9%
Britian	Claudius II	Milan 1	274	0.08	47	84.36	99.9%
France	Gallienus	Rome 4	270	0.1	22	28.18	99.9%
France	Gallienus	Rome 4	276	0.1	21	38.39	99.9%
France	Gallienus	Rome 5	270	1.21	19	42.88	99.9%
France	Gallienus	Rome 5	275	1.21	17	41.49	99.9%
France	Gallienus	Rome 5	285	1.21	13	35.27	99.9%
France	Gallienus	Rome 5	291	1.21	7	24.9	99.75%
France	Gallienus	Rome 6	270	1.09	15	22.94	99%
France	Gallienus	Rome 6	274	1.09	16	35.03	99.9%
France	Gallienus	Rome 6	285	1.09	21	32.73	99.9%
France	Gallienus	Milan 7/8	274	0.32	16	17.42	99.9%
France	Gallienus	Milan 7/8	276	0.32	15	13.06	97.5%

Table 7.5 contd

France	Claudius II	Rome 2	270	1.15	25	25.76	99.9%
France	Claudius II	Rome 2	285	1.15	24	32.31	99.9%
France	Claudius II	Rome 3	274	0.36	16	23.87	99.9%
France	Claudius II	Rome 3	275	0.36	13	22.16	99.9%
France	Claudius II	Rome 3	285	0.36	14	21.31	99.9%
France	Claudius II	Milan 1	270	0.68	31	21.99	99.9%
France	Claudius II	Milan 2	275	0.17	24	25	99.9%
France	Claudius II	Milan 2	285	0.17	14	16.29	99.75%

1. The behaviour of the coin pool in Britain and France was different during and after the period of the Gallic Empire with respect to both Gallic and Central Empire coins.
2. The movement of Central Empire coins into Gallic hoards was impeded to a certain degree, at least initially.
3. There was an influx of Central Empire coins prior to 270/1AD to facilitate the hoarding of them around this time, possibly after the debasement by Postumus in 268.

7.6 Italy

The above analysis seeks to define patterns and trends in the base silver coinage within the bounds of the Gallic Empire but one must ask if the mixing of the Gallic and Central Empire coinage occurred outside those limits? I have not collected data in order to be able to answer this question however one may use some of the data collected by others to perhaps suggest what was happening, particularly in northern Italy, the area nearest the Gallic Empire.

Examination of the tables produced by Richard Reece on the coins in European museums demonstrate that there are Gallic Empire coins in northern Italy, particularly those of Postumus⁶⁷. For example the collection from Cortona for the period 259-94 contains 16 coins of Postumus, 10% of the total for the period; Bologna (Civic) 57 (2.5% for the period) and Bologna University 31 (2.9%). If one is comfortable with the

assumption that the coins within the provincial museums are from local finds and, judging by the close correlation between the two Bologna collections there is apparently so, then there seems to have been a circulation of the good silver coins of the Gallic regime within northern Italy, distribution by the intrinsic value of the coins outweighing distribution by politics⁶⁸. It must be remembered that until the debasement of 268 the coins of Postumus contained much more silver than their Central Empire contemporaries, visibly much more.

After the debasement Gallic coins are encountered in reasonable numbers considering the relative brevity of the reigns, although coins of the equally brief emperor Claudius II outnumber them by at least 3:1.

There is one significant problem with Reece's tables however and that is the temporality. There is no indication as to when the Gallic Empire coins were circulating in northern Italy in order for them to be incorporated into the finds in local museums.

The summary tables, reproduced as table 7.6, provided by Callu follow a different tack and whilst they lack the breakdown by mint and issue they are at least able to tell us whether Gallic coins are found in Italian hoards⁶⁹. Here the picture is different to that painted by the tables in Reece for whilst Gallic Empire coins are represented in reasonable numbers in collections in northern Italy their occurrence in hoards is rather more sparse, possibly suggesting that the Italian museum specimens are from individual finds or are more recent imports into the country.

Table 7.6 Gallic Empire coins in Italian hoards (from Callu)

HOARD	<238	>238	Valerian/ Gallienus	Macrianus/ Quietus	Claudius II	Quintillus	Divo Claudio	Aurelian	Postumus	Marius	Laelian	Victorinus	Tetricus I/II
LA VENERA		5	5863		4877	354		11118	126 Gallic Empire, indeterminate reigns				
SAN PIERO			1					34					
RAGEVO		1	1605		2101 (inc D.Claudius)	99	See left	378	1		1		4
PEAL DE BECERRO		5	792		463	32		19	5 Gallic Empire, indeterminate reigns				
OSTIA			39		24	1		23					
ARONA			330		2105	281		95	2				
FOSSANO			79		359	24	9	25	2				
LODIVECCHIO	59	686	137					3					
REGGIO EMILIA			88		165	10		4					
SCARNAFIGI			370		663	39		522	7				
BRONI		1	236		120								
CASTELLO SURA		2	168		48	1							
CAMPORE	5	7	5		1								
FALERONE	6	414	6497+	6					4				
OSTIA		7	306										
PORTO TORRES		12	1										
ROME		10	182										
SANTA MARIA DI TORINO		12	798										

NOTE: The total number in the table does NOT necessarily reflect the total number of coins in the hoard

In conclusion the occurrence of Gallic Empire coins from known sources in Italy does not support their wide circulation there, unlike the circulation of Central Empire coins in Gallic territories, although it has to be said that the evidence for this requires further analysis.

7.7 Summary

The above descriptions of the graphs of the individual behaviour of the coin issues hoarded obscures any broad patterns which may exist. Tables 7.7a-d plot the observed hinges of the cusum plots and identify where there is a rising (positive, black) or falling (negative, red) trend for the Central Empire antoniniani and earlier Gallic antoniniani. Thus they indicate when coin issues occur in hoards greater or less than the overall mean for the issue.

When the hinges of the Central Empire coins are thus tabulated there appears to be an influx of Central Empire types occurring in hoards deposited in 271 in Britain and less than the overall mean after 274/5AD. This is, perhaps, the opposite to what one may expect. That is, one may have expected the Central Empire coins to have been excluded until 274 and the fall of the Gallic regime after which there would be a rise. The last Milan issue of Claudius II does not behave in this manner but that does not mean that these are not entering at the same time as the other Central Empire coins. It is just that they are contemporaneous with the hoard deposition at this time and therefore didn't have a previous "negative" phase when they were under-represented.

The decline in Central Empire coins in French hoards around 274/5 is also identified,

	260	265	270	275	280	285	290	295	300
Rome 4									
Britain	+VE								
	-VE								
France	+VE								
	-VE								
Rome 5									
Britain	+VE								
	-VE								
France	+VE								
	-VE								
Rome 6									
Britain	+VE								
	-VE								
France	+VE								
	-VE								
Milan 7/8									
Britain	+VE								
	-VE								
France	+VE								
	-VE								

Table 7.7a Cusum hinges in antoninianus hoards of Gallienus

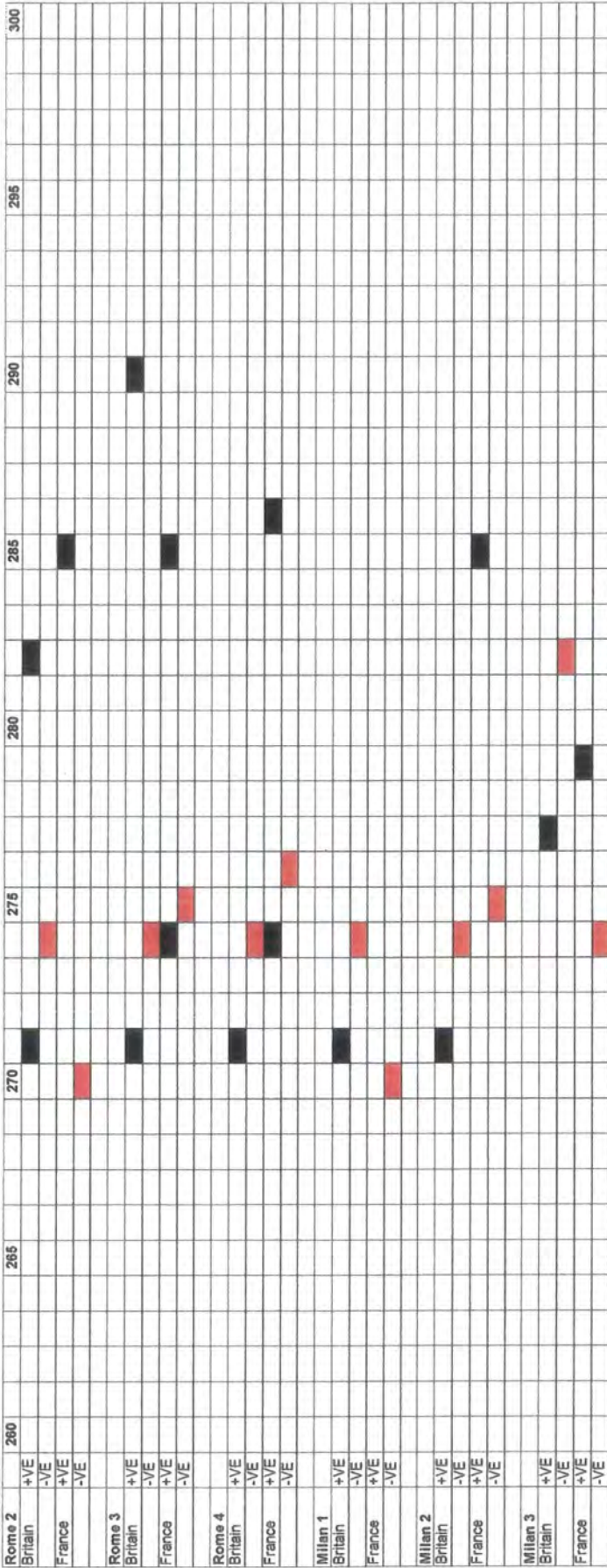


Table 7.7b Cusum hinges in antoninianus hoards of Claudius II

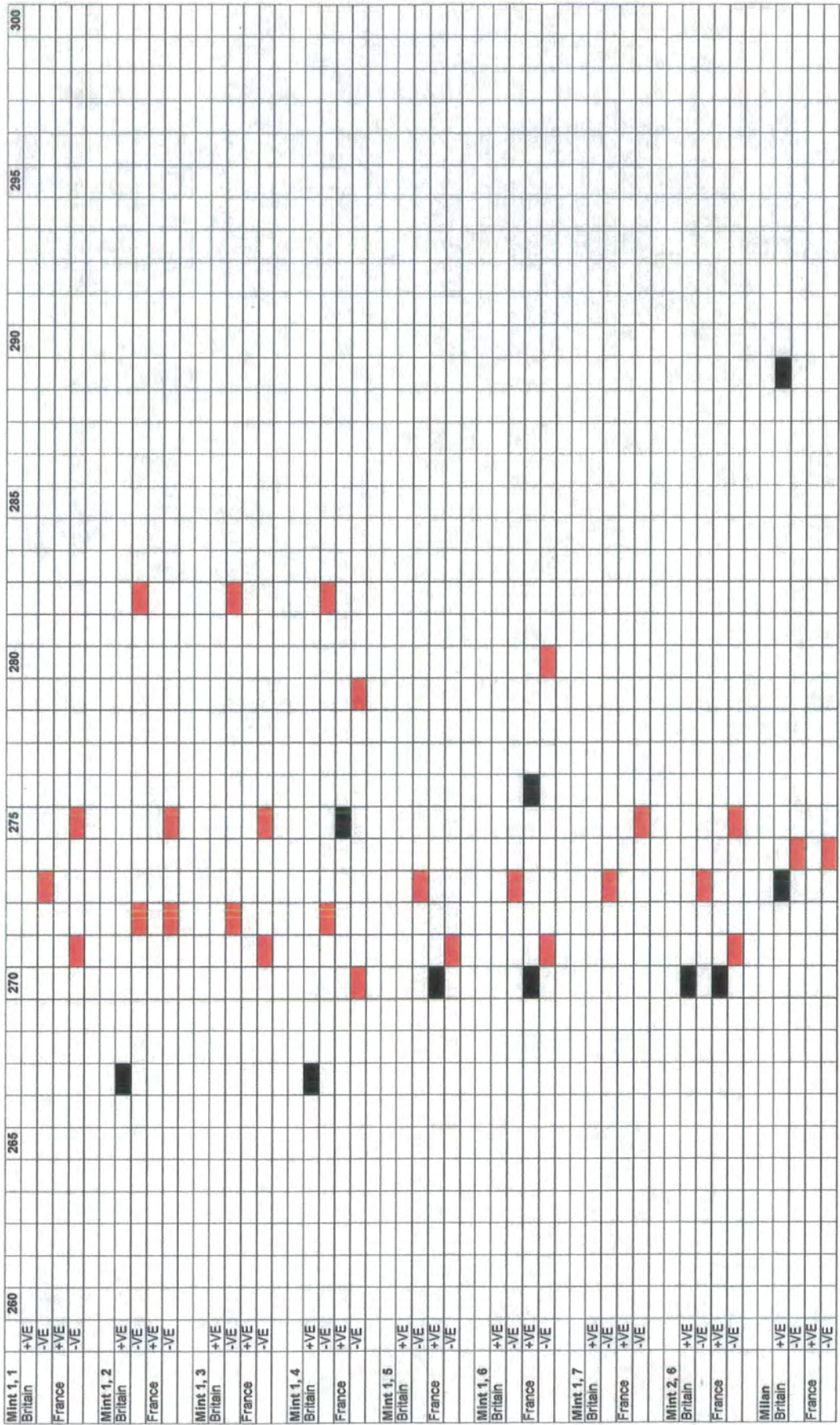


Table 7.7c Cusum hinges in antoninianus hoards of Postumus

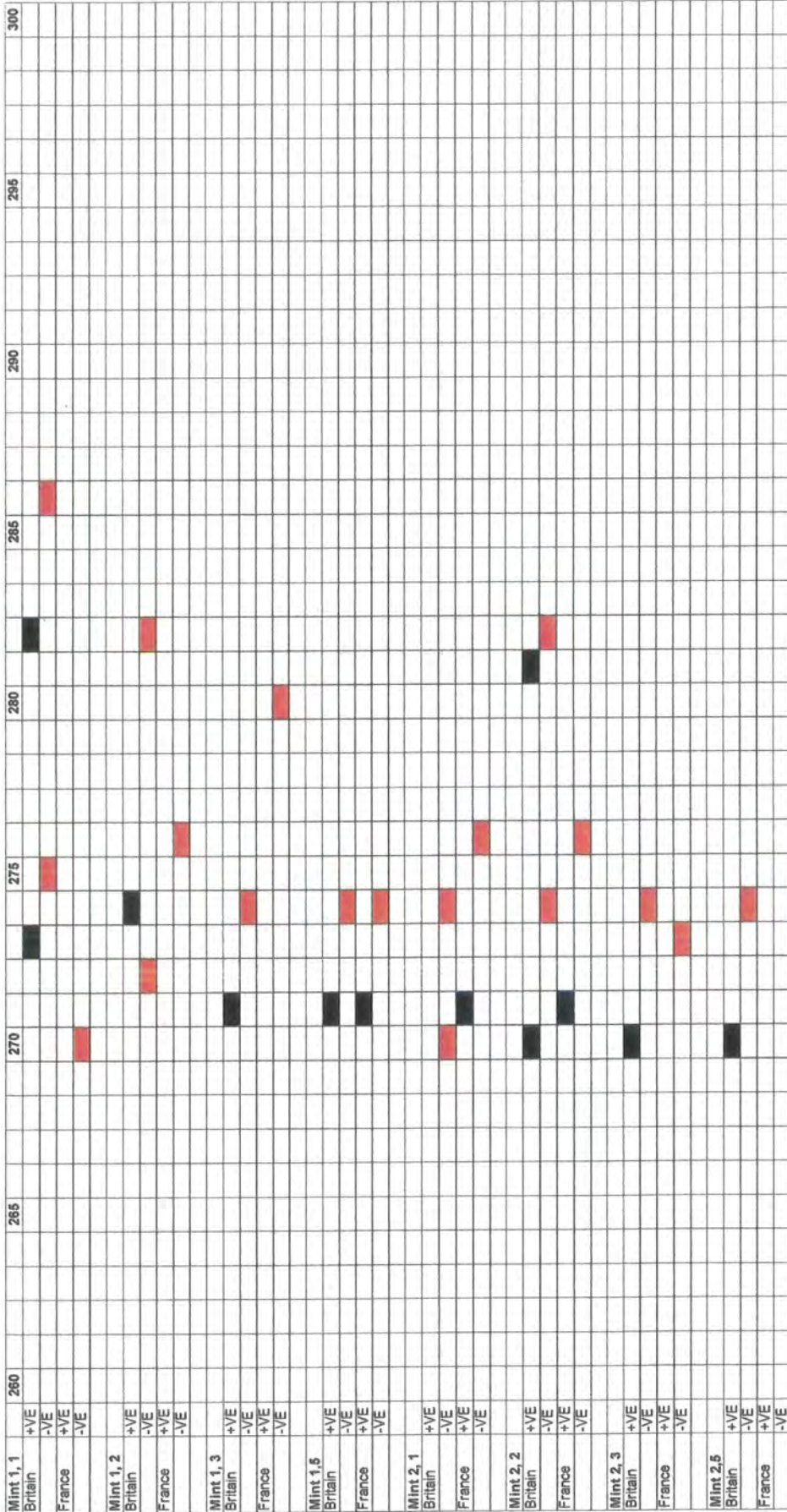


Table 7.7d Cusum hinges in antoninianus hoards of Victorinus

recognising poor circulation of official coins post capitulation and suggesting the reason for the widespread circulation of so many imitative coins.

The good silver coins of Postumus demonstrate signs of disappearing from hoards deposited after 271/2. The coins of Victorinus which are generally of much poorer alloy become underrepresented in British and French hoards with terminal dates of 274/5 onwards, again contributing to the shortage of circulating coin.

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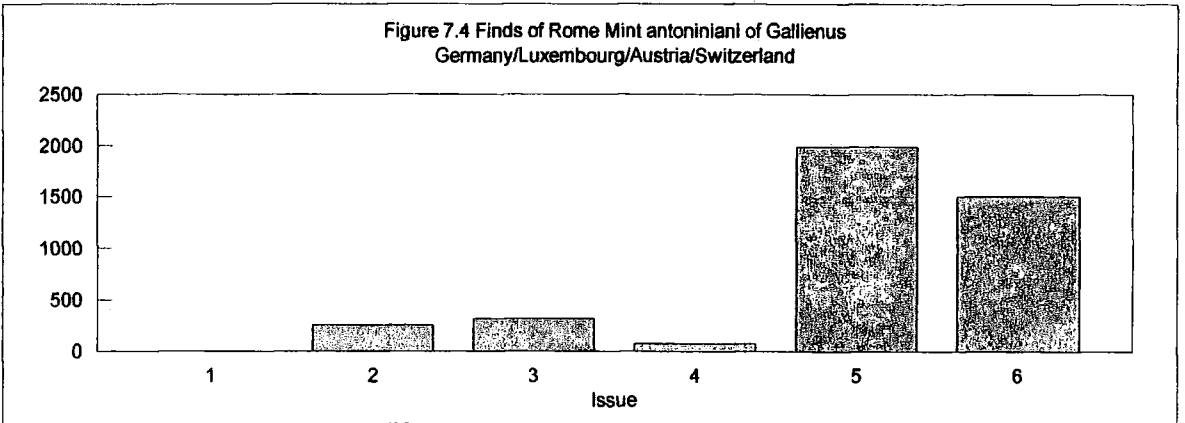
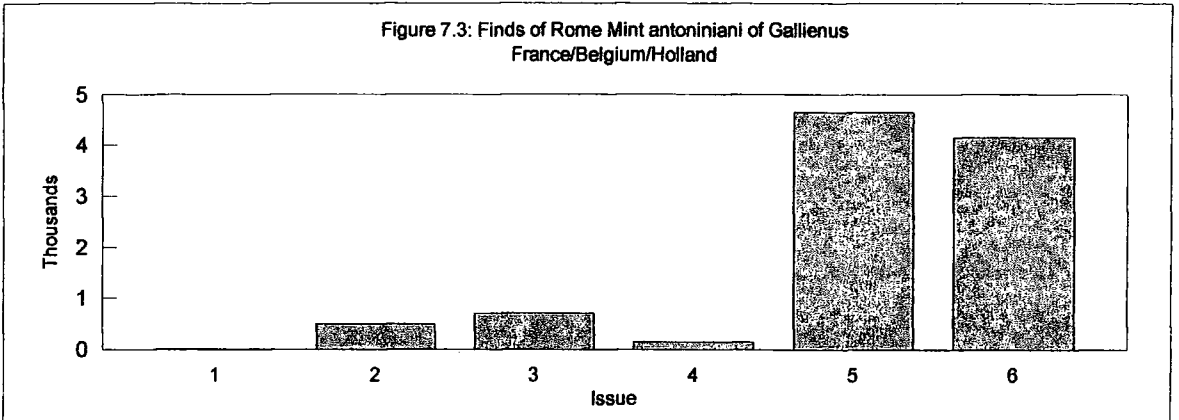
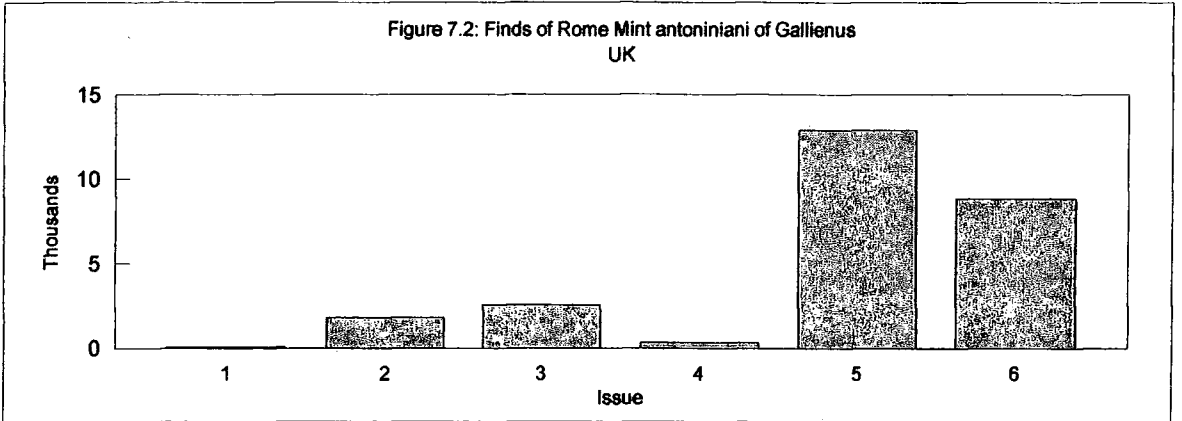
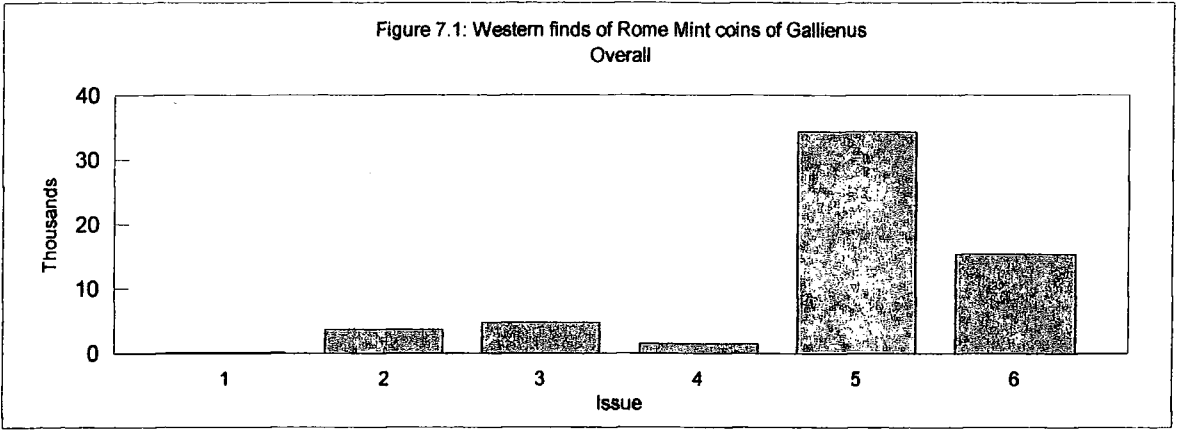


Figure 7.5: Gallienus Rome Mint issue 4 antoniniani
UK hoards cusum

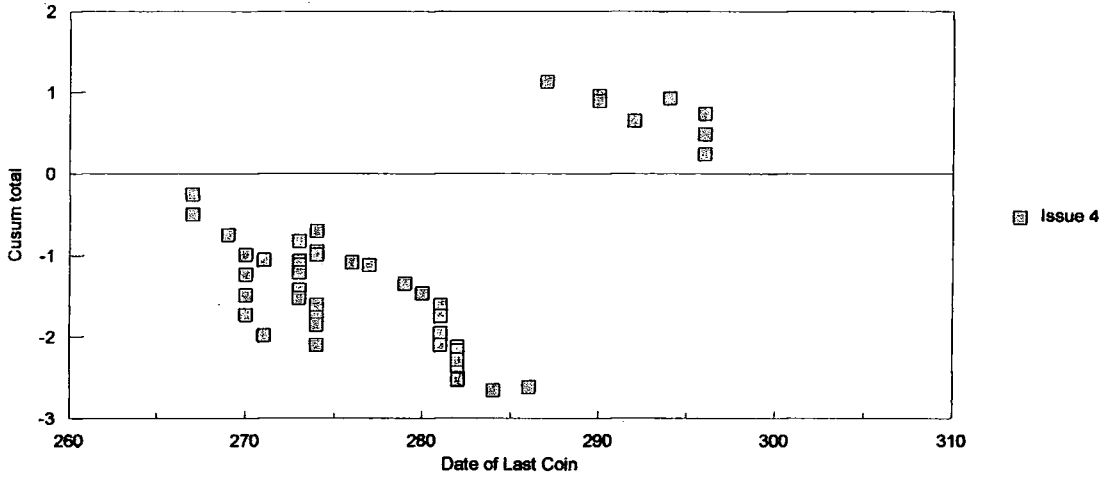


Figure 7.6: Gallienus Rome Mint issue 4 antoniniani
French Hoards cusum

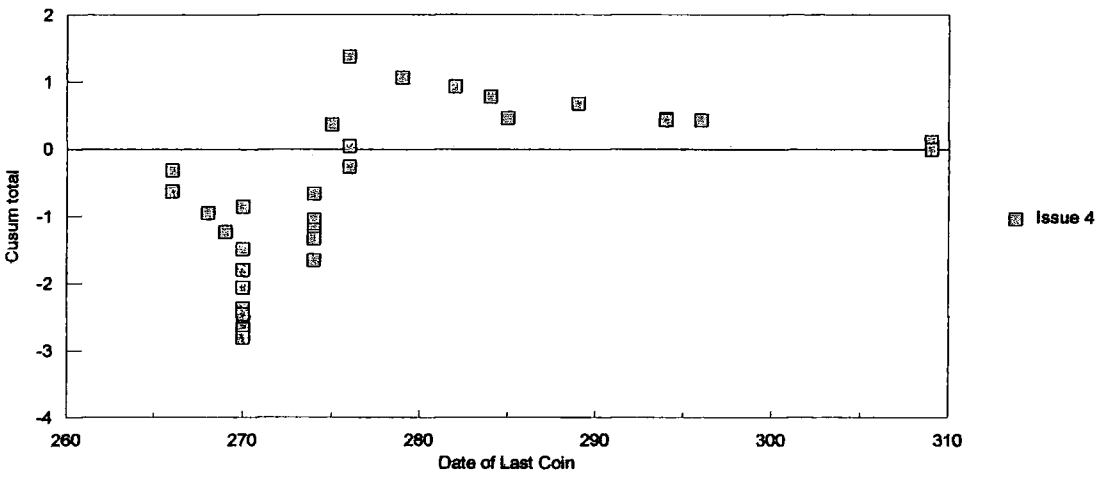


Figure 7.7: Gallienus Rome Mint issue 4 antoniniani
German hoards cusum

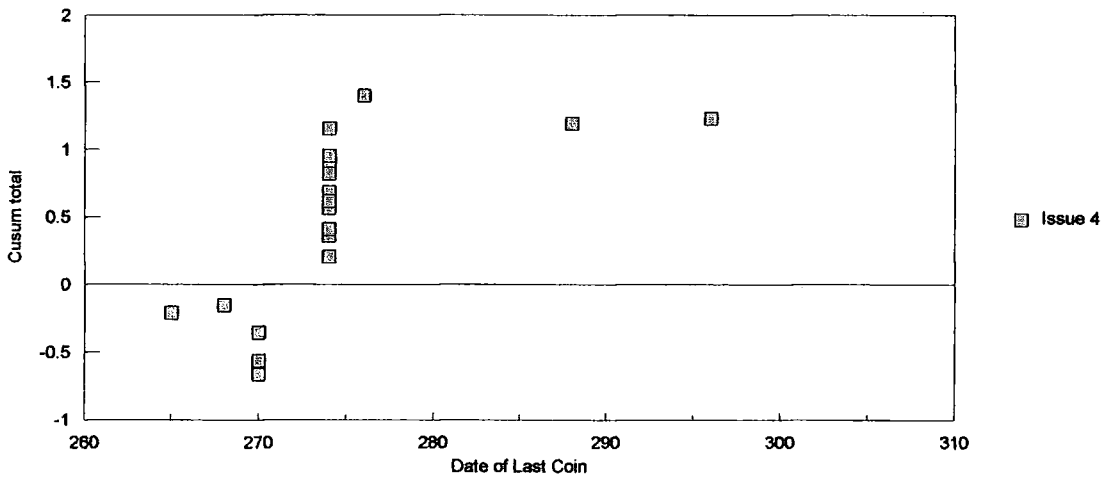


Figure 7.8: Gallienus Rome Mint issue 5 antoniniani
UK hoards cusum

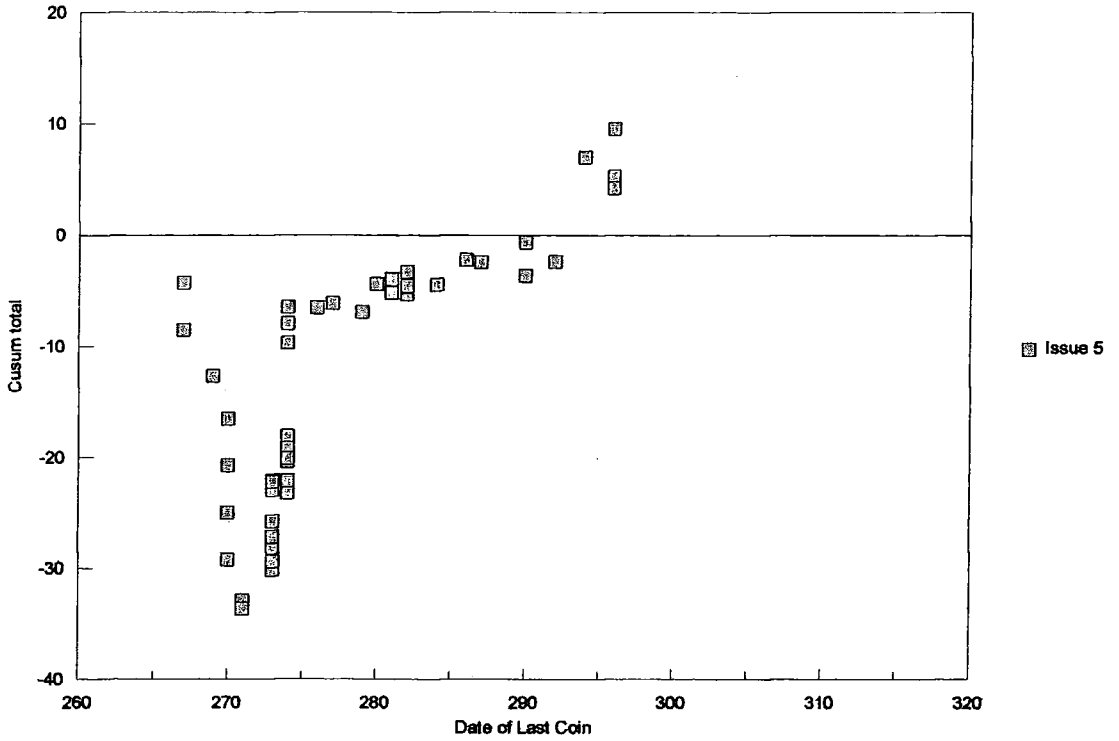


Figure 7.9: Gallienus Rome Mint issue 6 antoniniani
UK hoards cusum

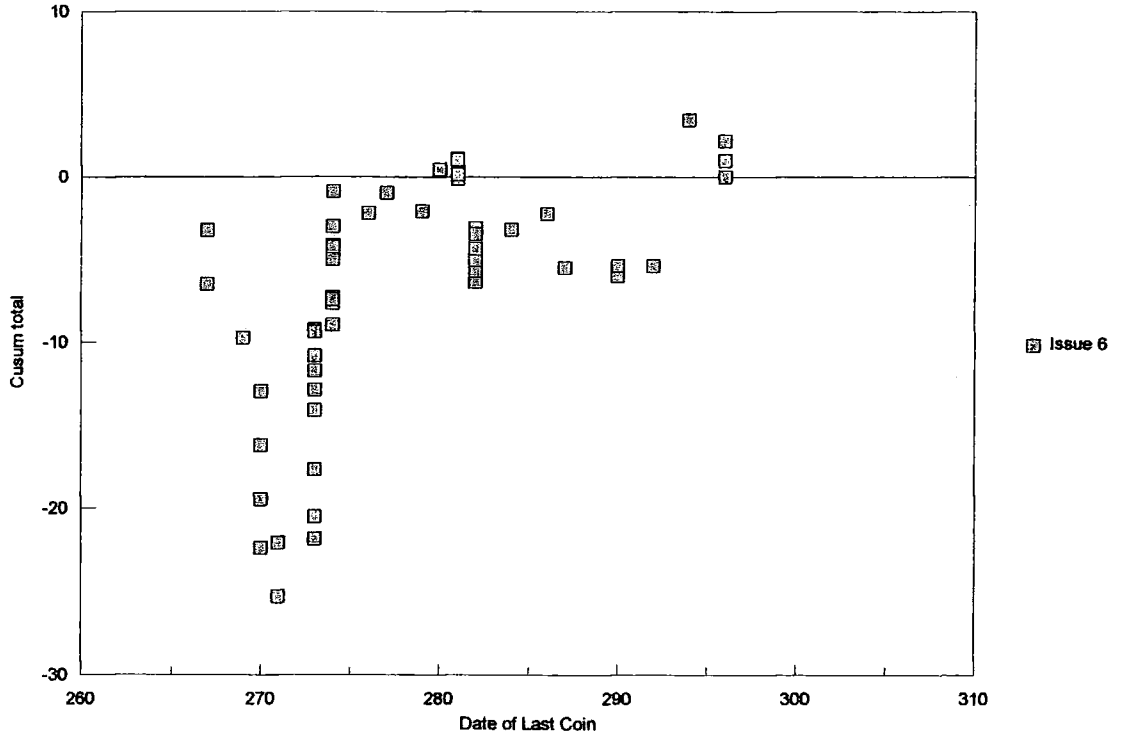


Figure 7.10: Gallienus Rome Mint issue 5 antoniniani
French hoards cusum

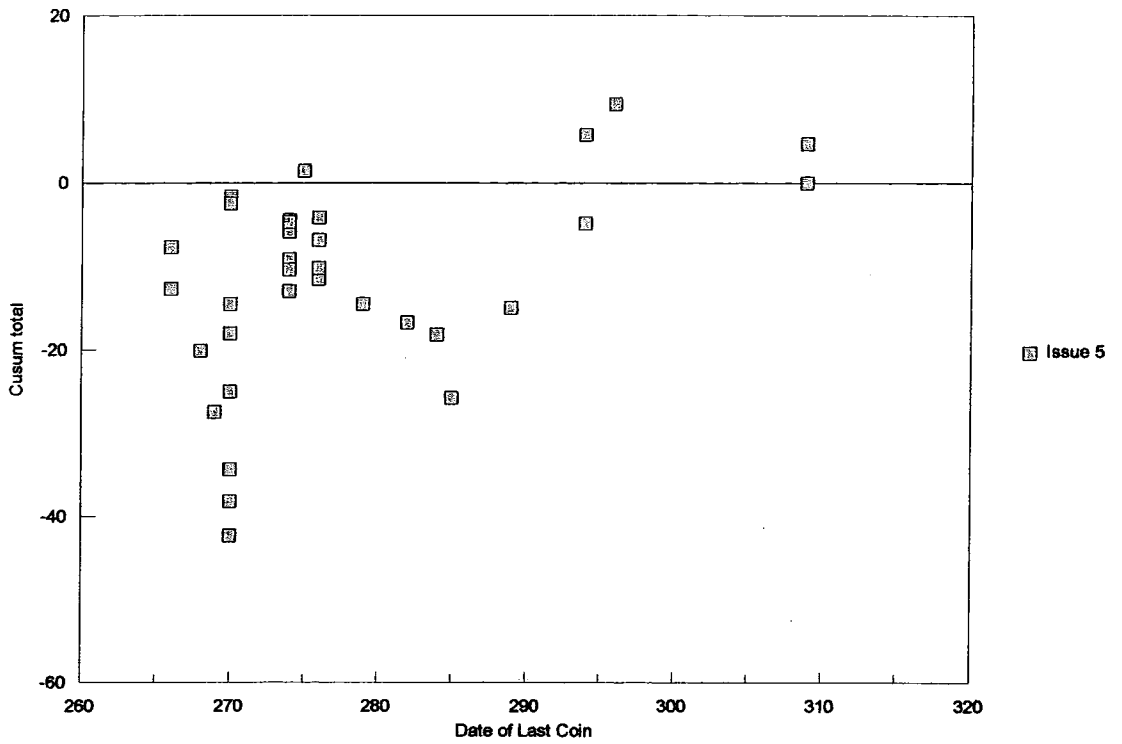


Figure 7.11: Gallienus Rome Mint issue 6 antoniniani
French hoards cusum

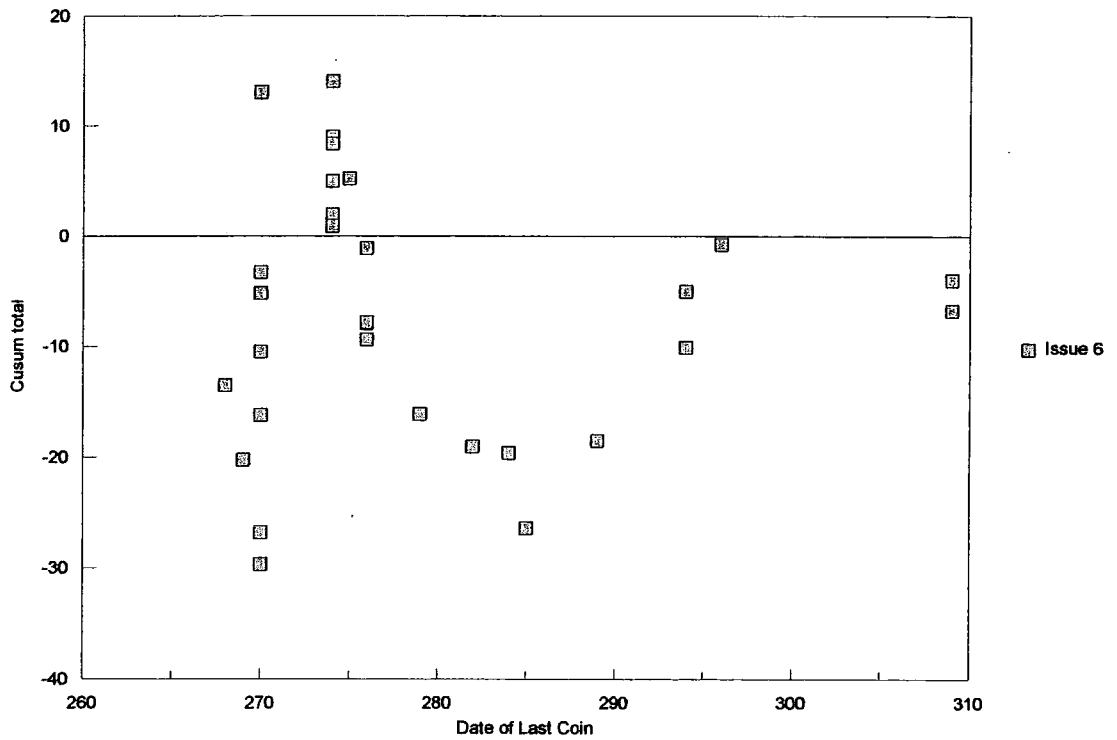


Figure 7.12: Gallienus Milan Mint antoniniani
UK hoards cusum

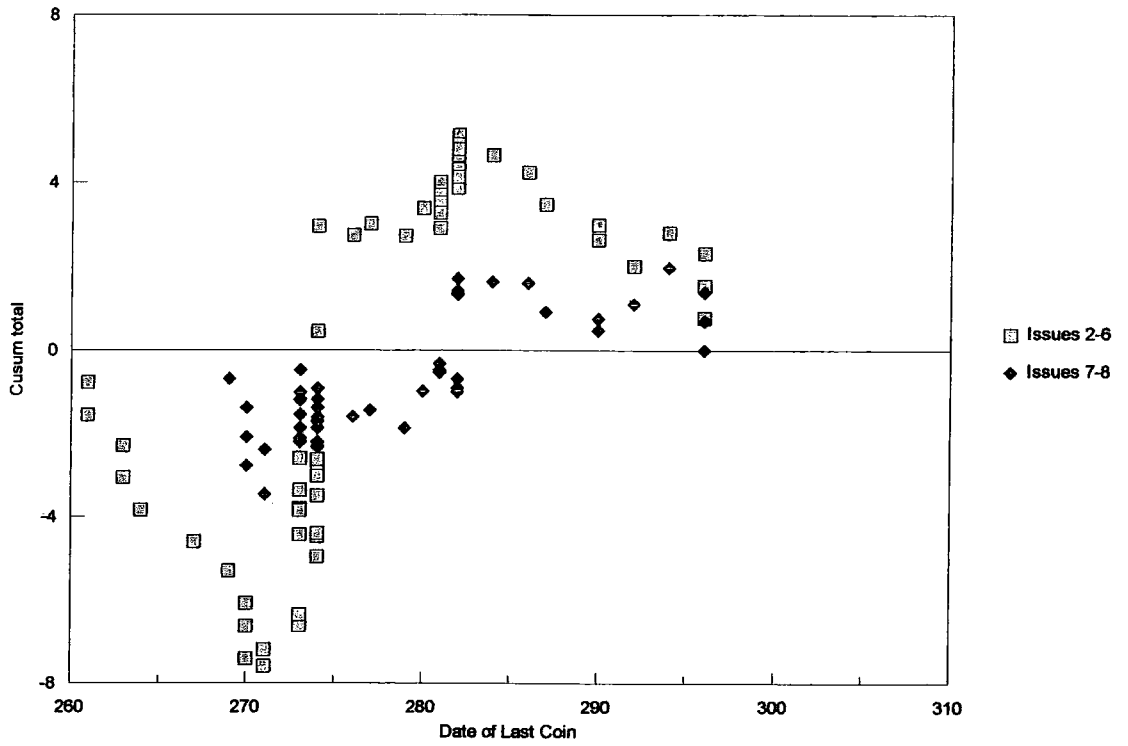


Figure 7.13: Gallienus Milan Mint antoniniani
French hoards cusum

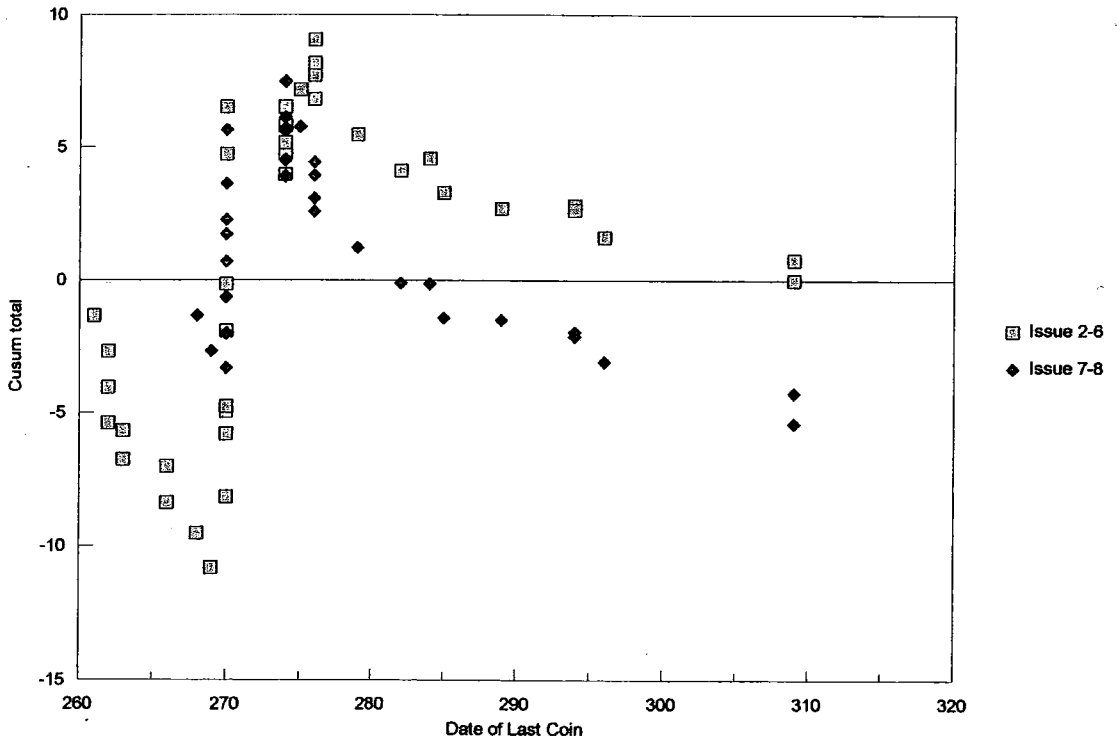


Figure 7.14: Claudius II Rome Mint issue 2 antoniniani
UK hoards cusum

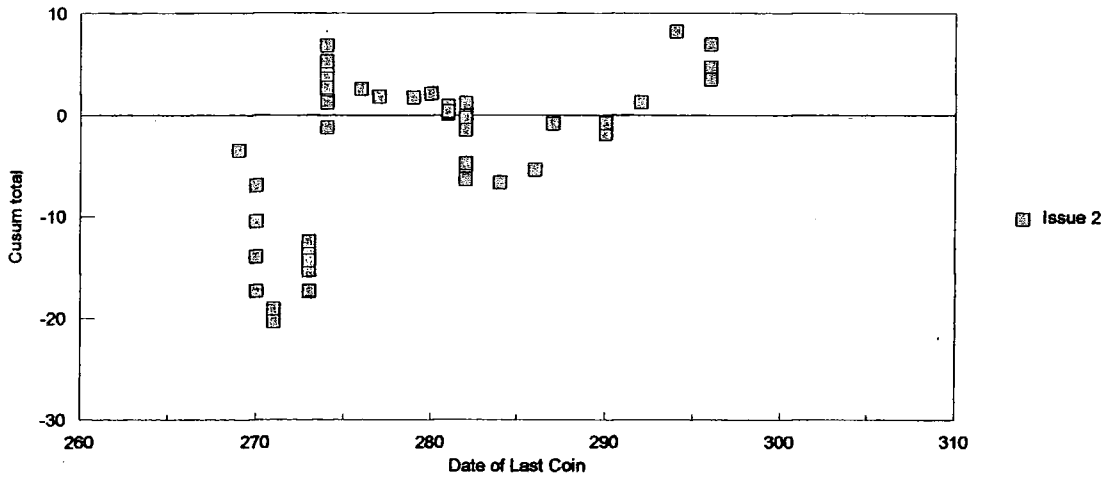


Figure 7.15: Claudius II Rome Mint issue 3 antoniniani
UK hoards cusum

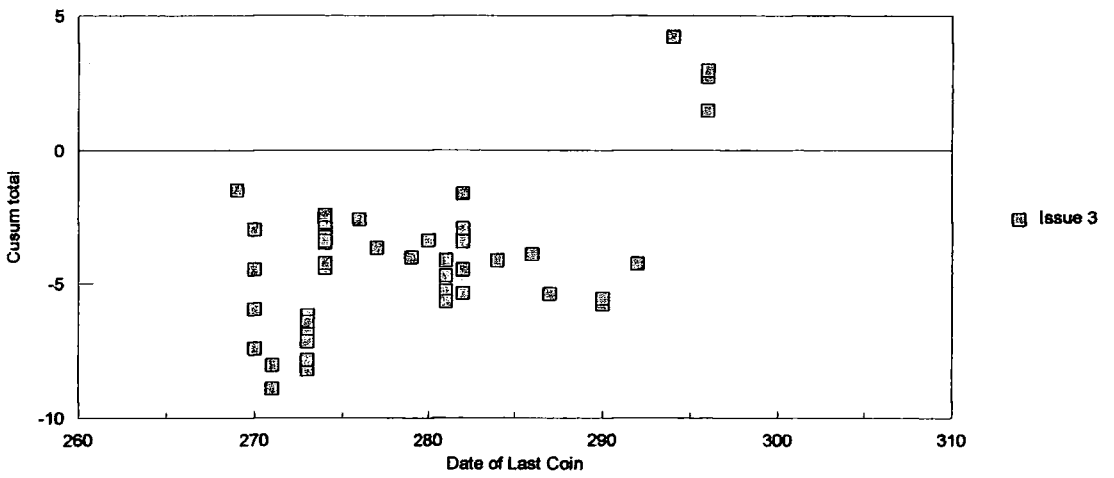


Figure 7.16: Claudius II Rome Mint issue 4 antoniniani
UK hoards cusum

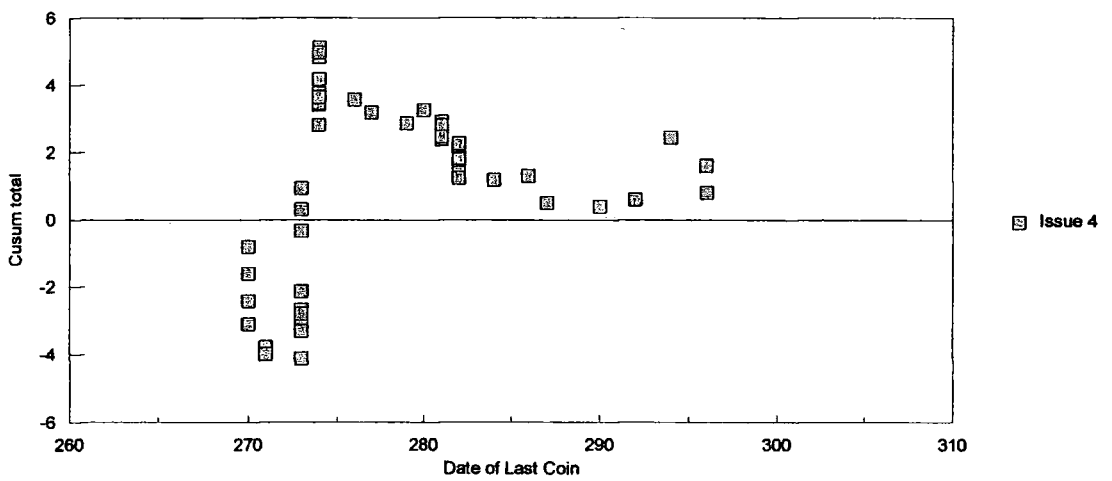


Figure 7.17: Claudius II Rome Mint issue 2 antoniniani
French hoards cusum

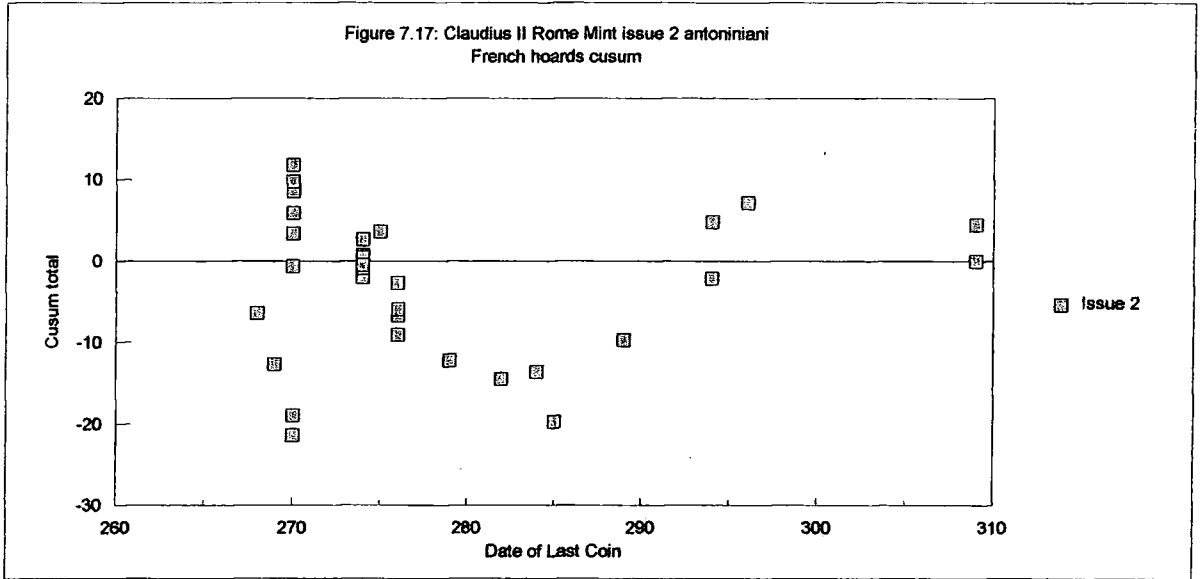


Figure 7.18: Claudius II Rome Mint issue 3 antoniniani
French hoards cusum

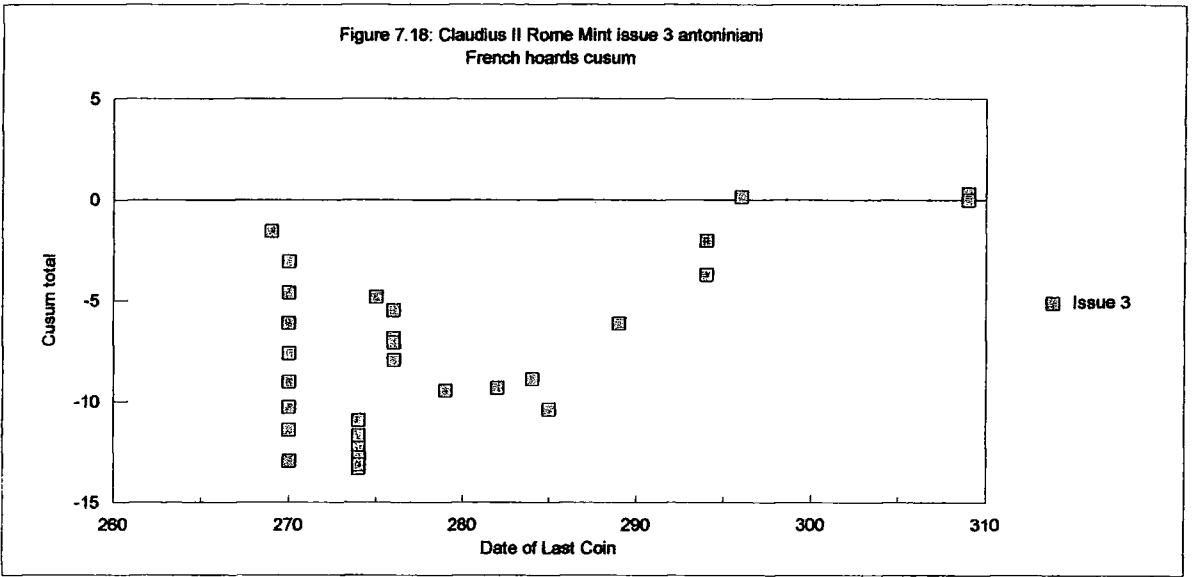


Figure 7.19: Claudius II Rome Mint issue 4 antoniniani
French hoards cusum

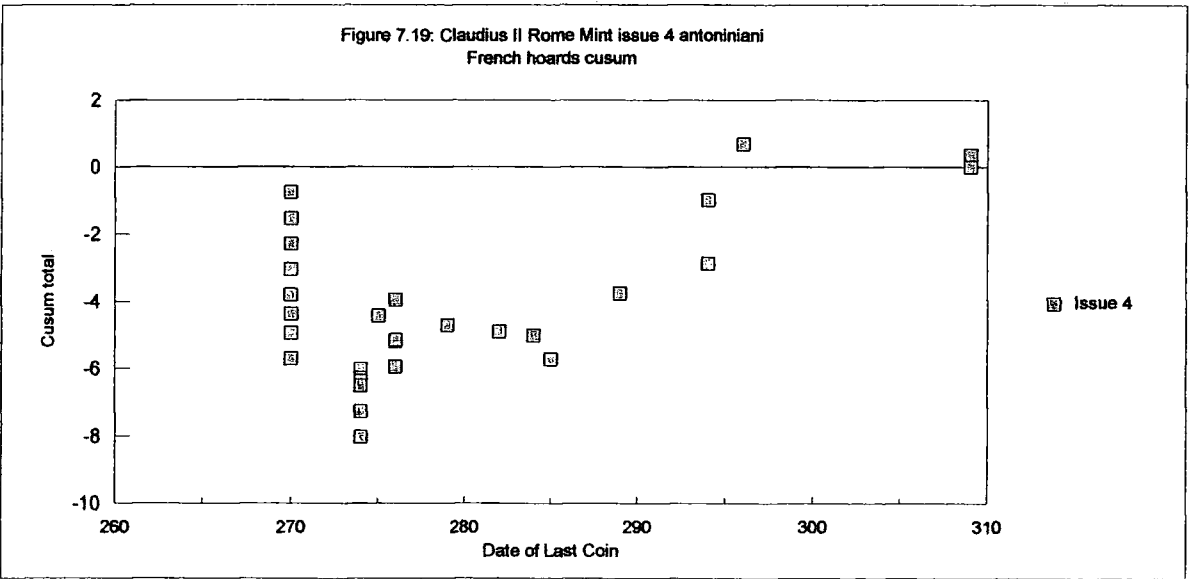


Figure 7.20: Claudius II Milan Mint issue 1 antoniniani
UK hoards cusum

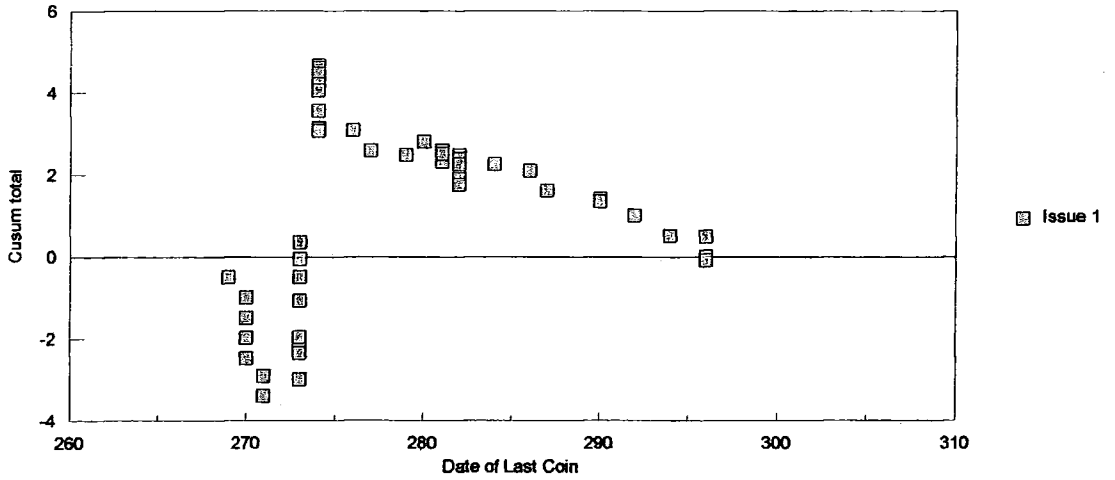


Figure 7.21: Claudius II Milan Mint issue 2 antoniniani
UK hoards cusum

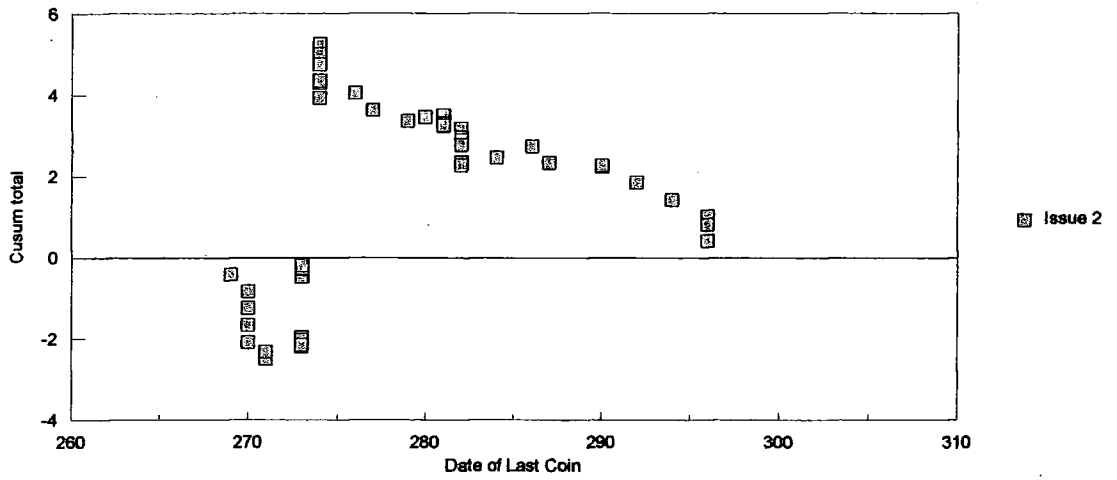


Figure 7.22: Claudius II Milan Mint issue 3 antoniniani
UK hoards cusum

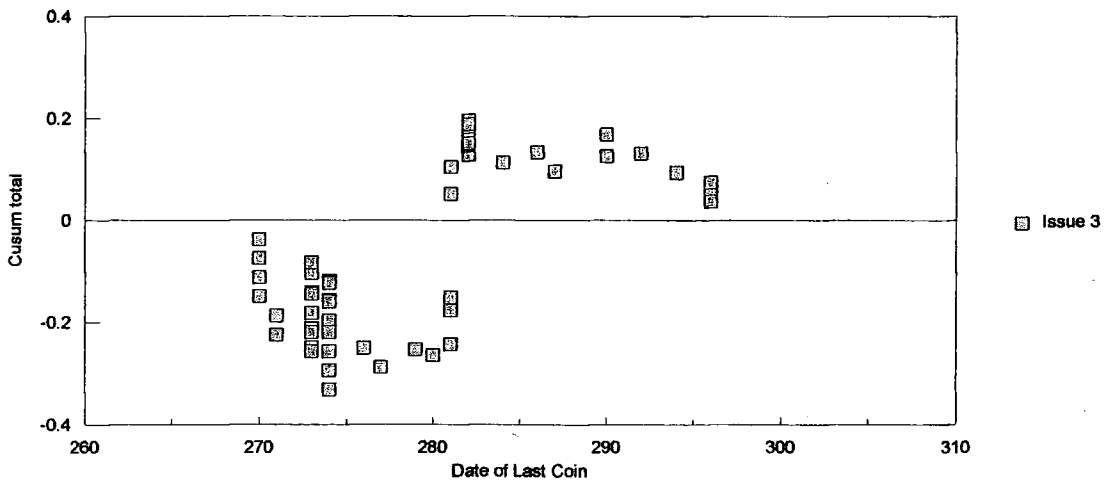


Figure 7.23: Claudius II Milan Mint issue 1 antoniniani
French hoards cusum

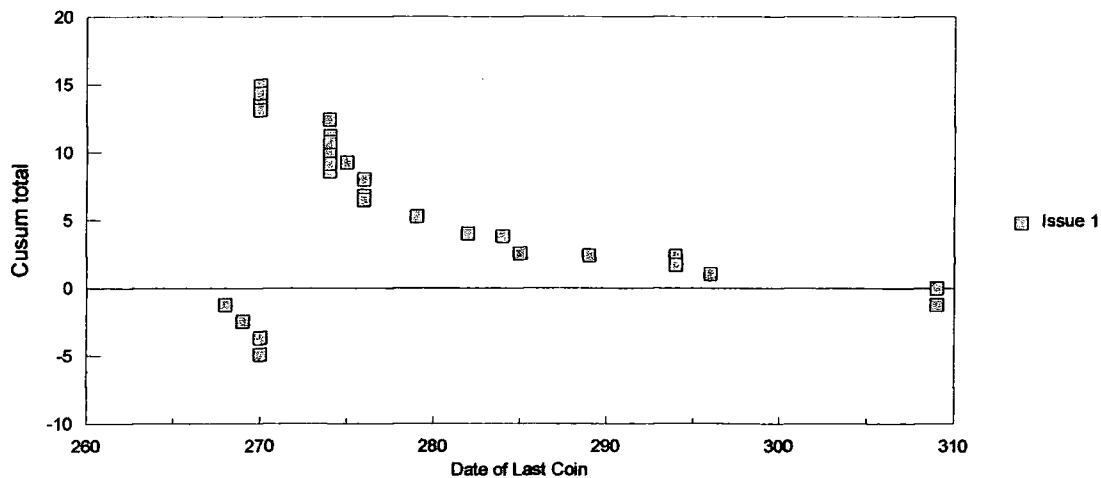


Figure 7.24: Claudius II Milan Mint issue 2 antoniniani
French hoards cusum

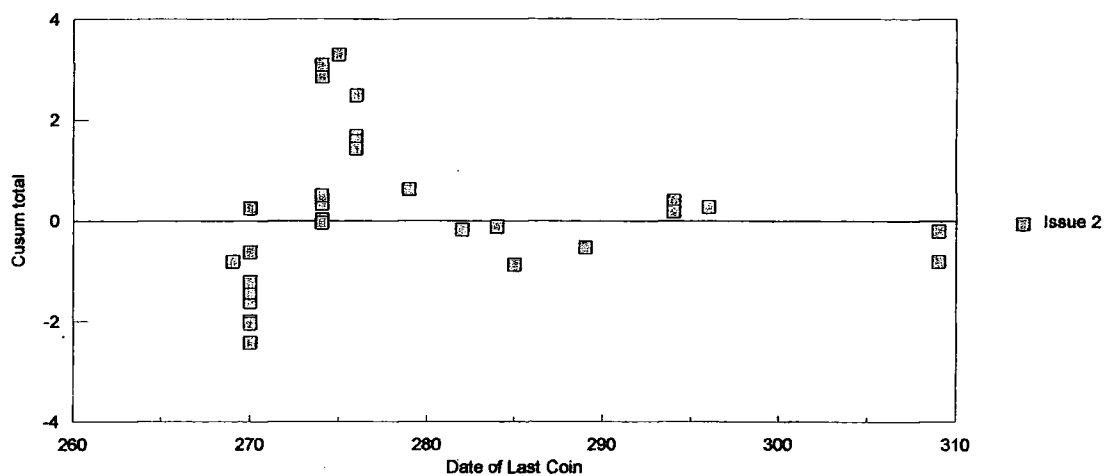


Figure 7.25: Claudius II Milan Mint issue 3 antoniniani
French hoards cusum

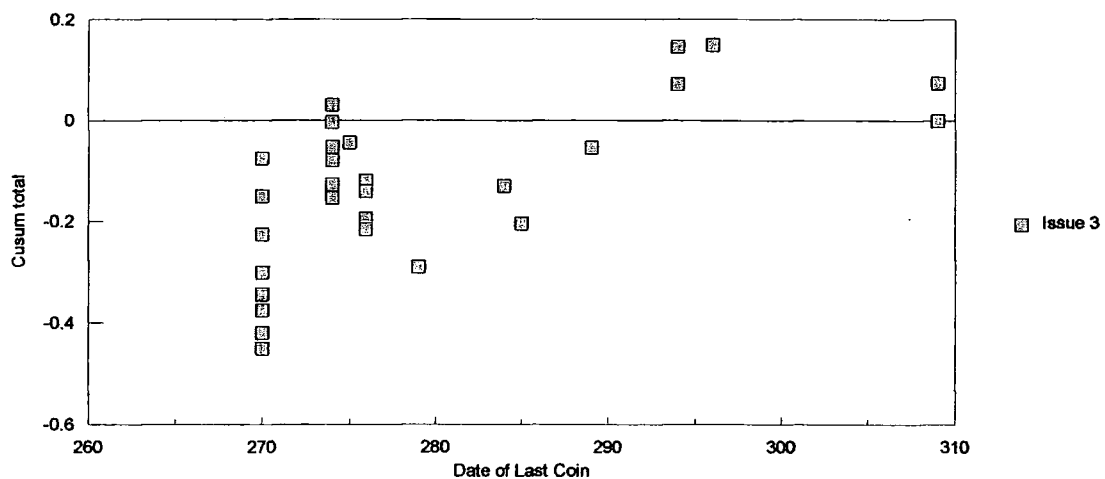


Figure 7.26: DIVO CLAVDIO and Quintillus Rome mint antoniniani
UK hoards cusum

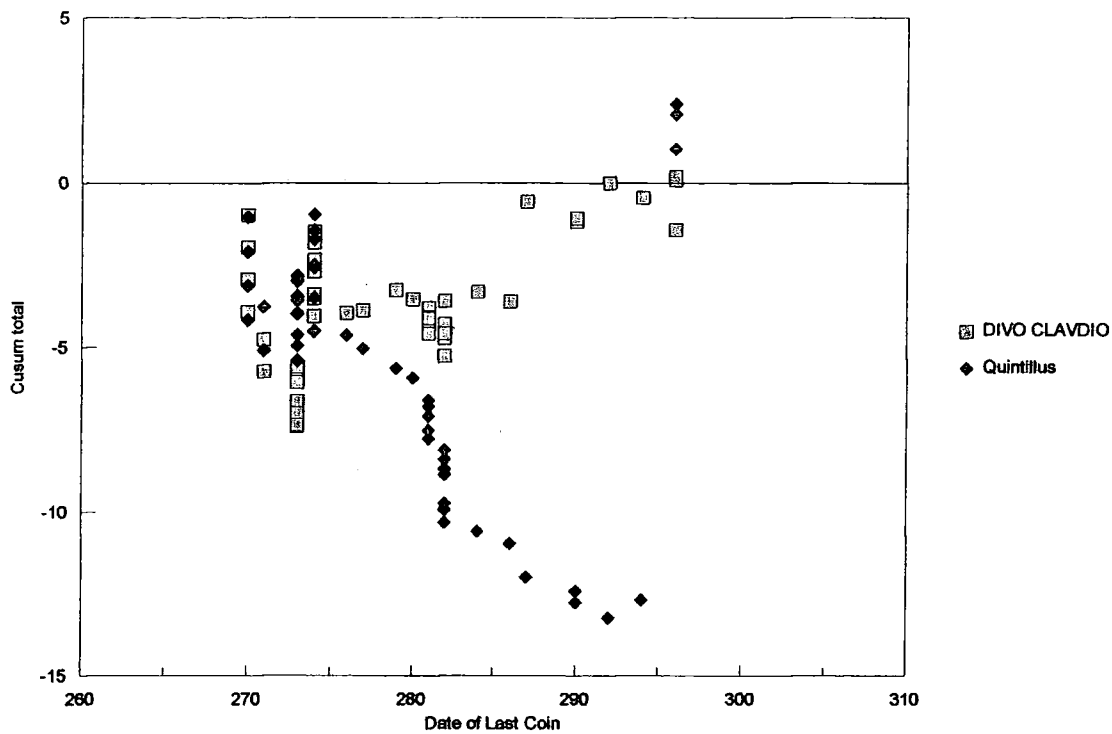


Figure 7.27: DIVO CLAVDIO and Quintillus Rome Mint antoniniani
French hoards cusum

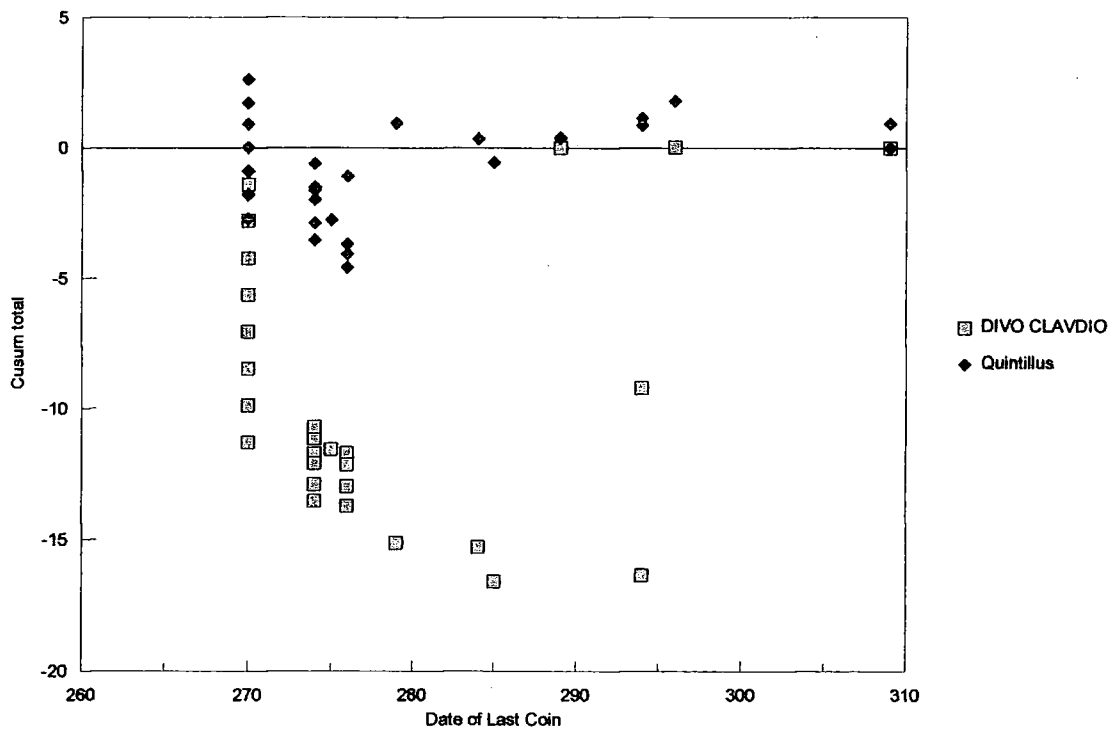


Figure 7.28: Aurelian Rome Mint pre reform antoniniani
UK hoards cusum

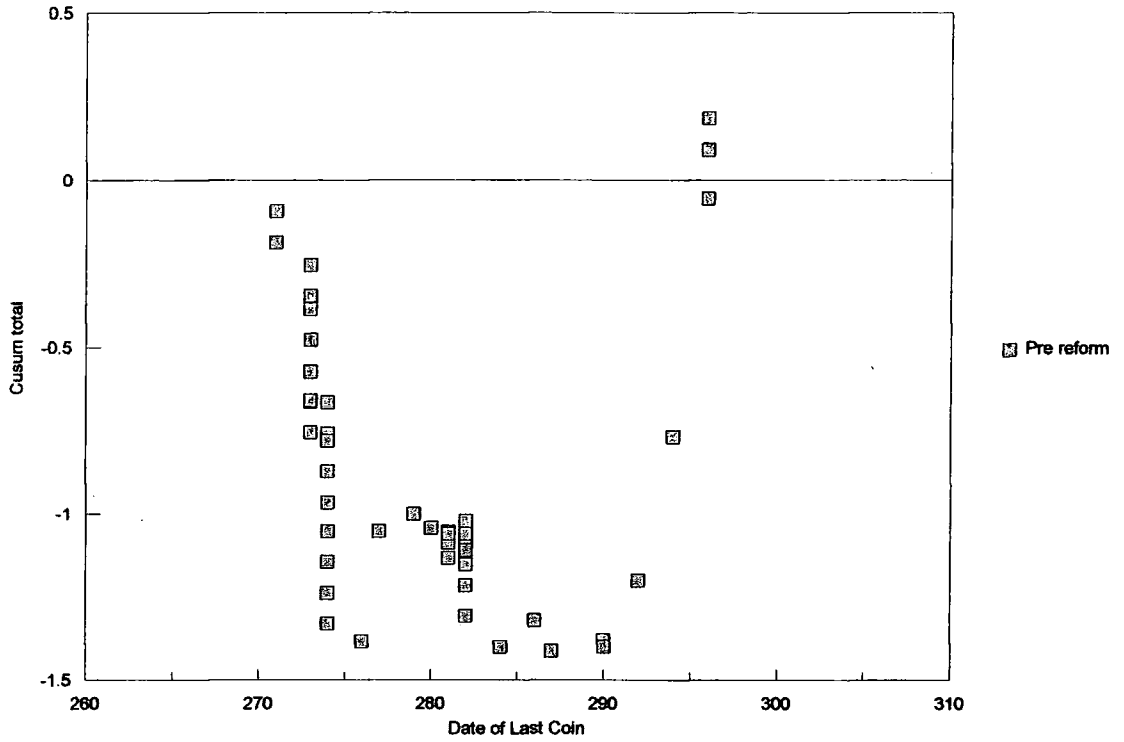


Figure 7.29: Aurelian Rome Mint post reform "aureliani"
UK hoards cusum

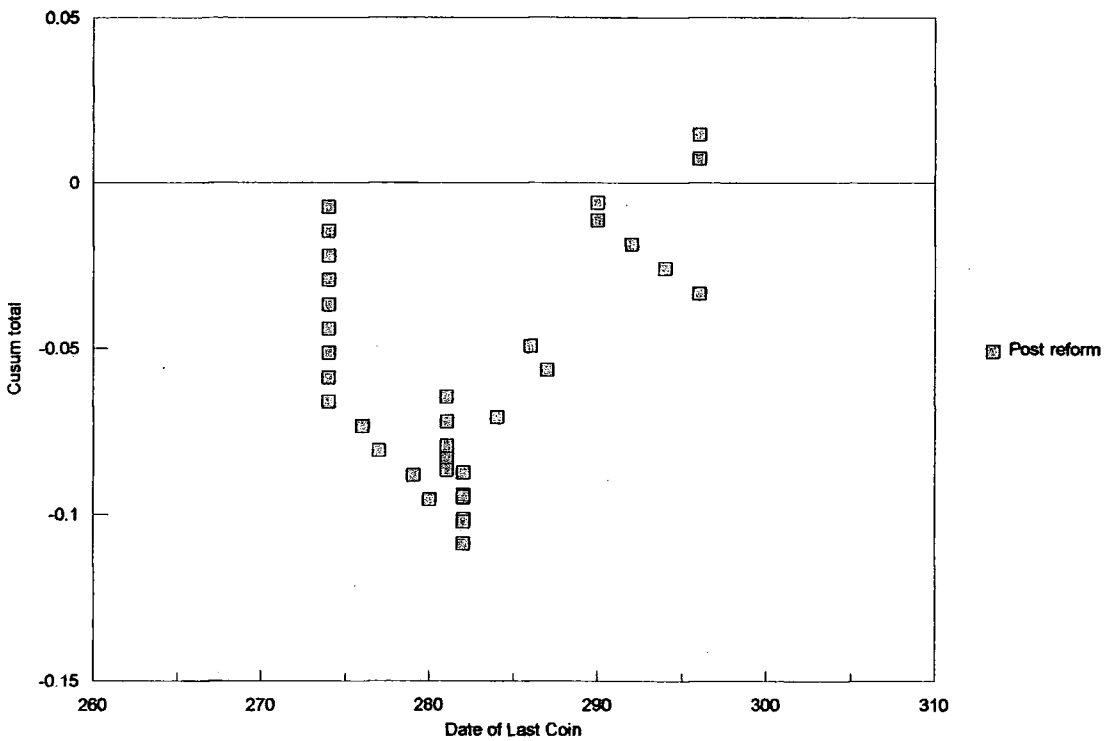


Figure 7.30: Aurelian Rome Mint pre reform antoniniani
French hoards cusum

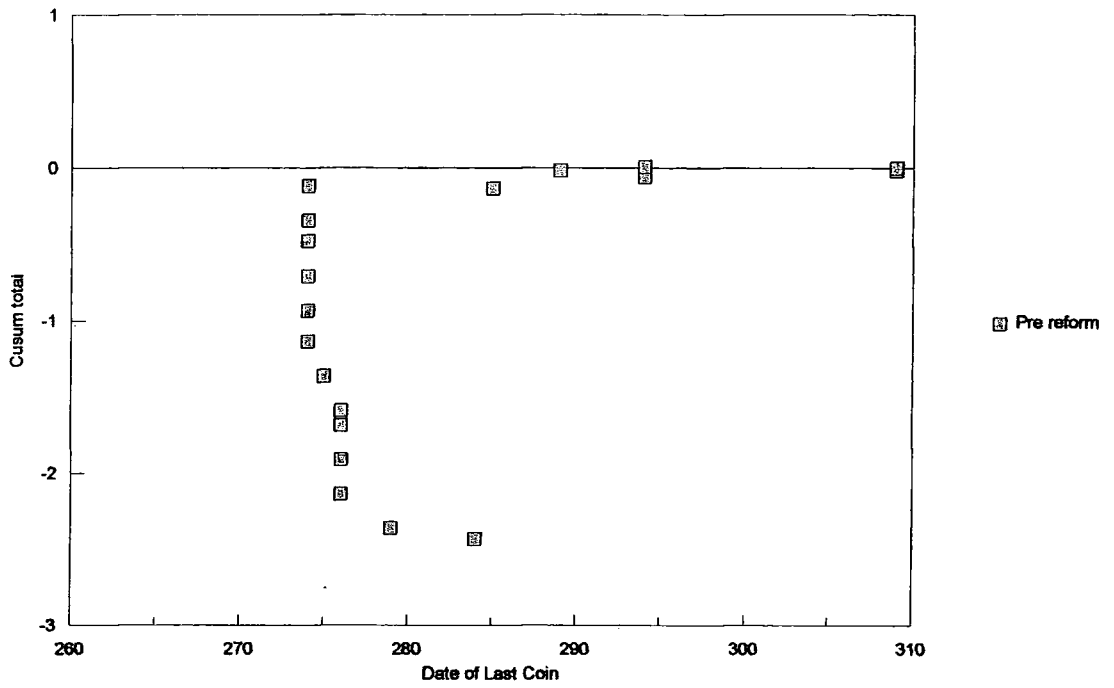


Figure 7.31: Aurelian Rome Mint post reform "aurellani"
French hoards cusum

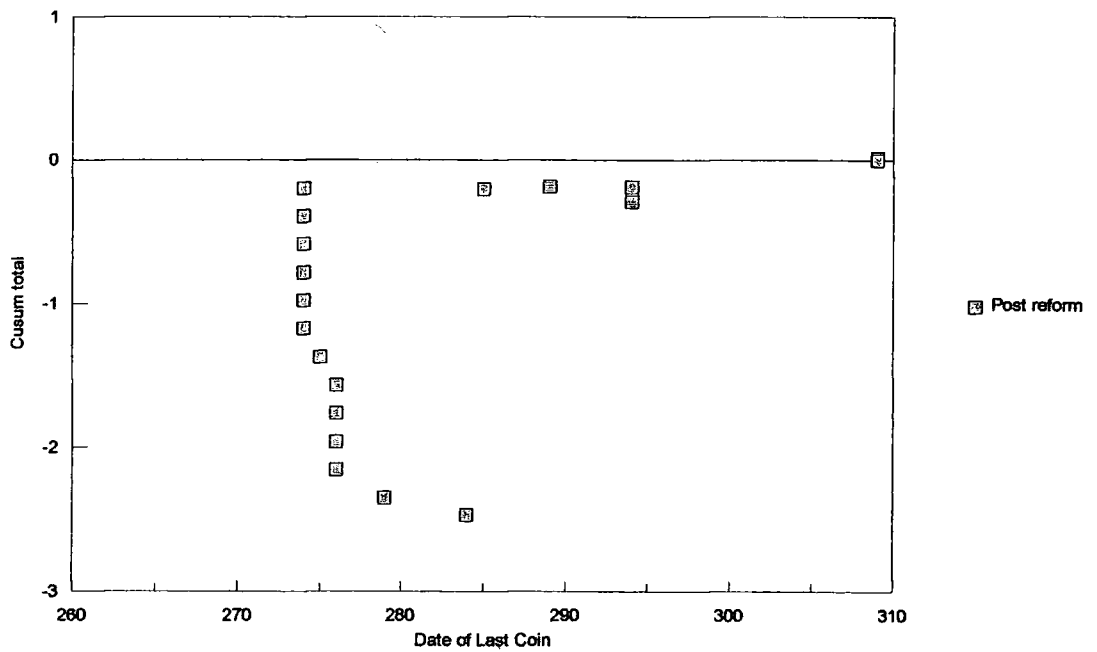


Figure 7.32: Western finds of antoniniani of Postumus
Overall

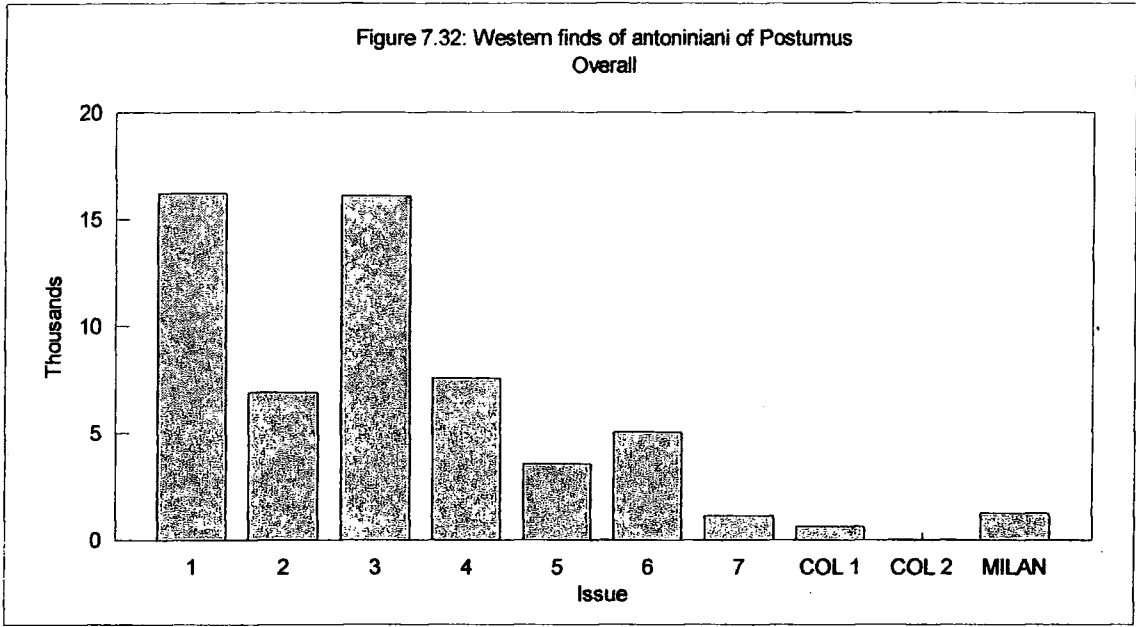


Figure 7.33: Antoniniani of Postumus
UK finds

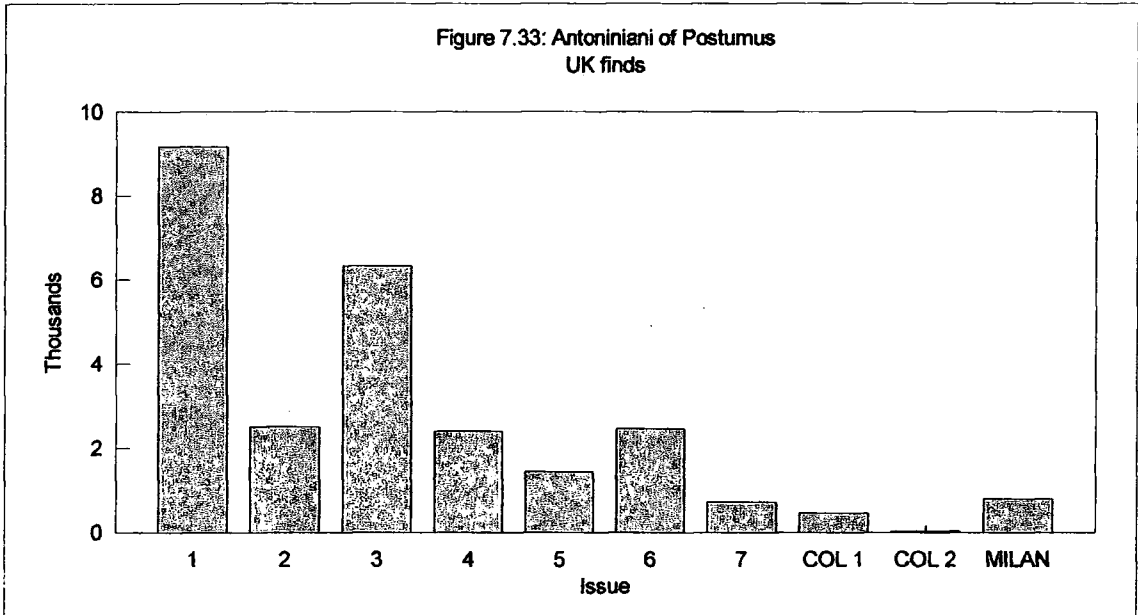


Figure 7.34: Antoniniani of Postumus
French finds

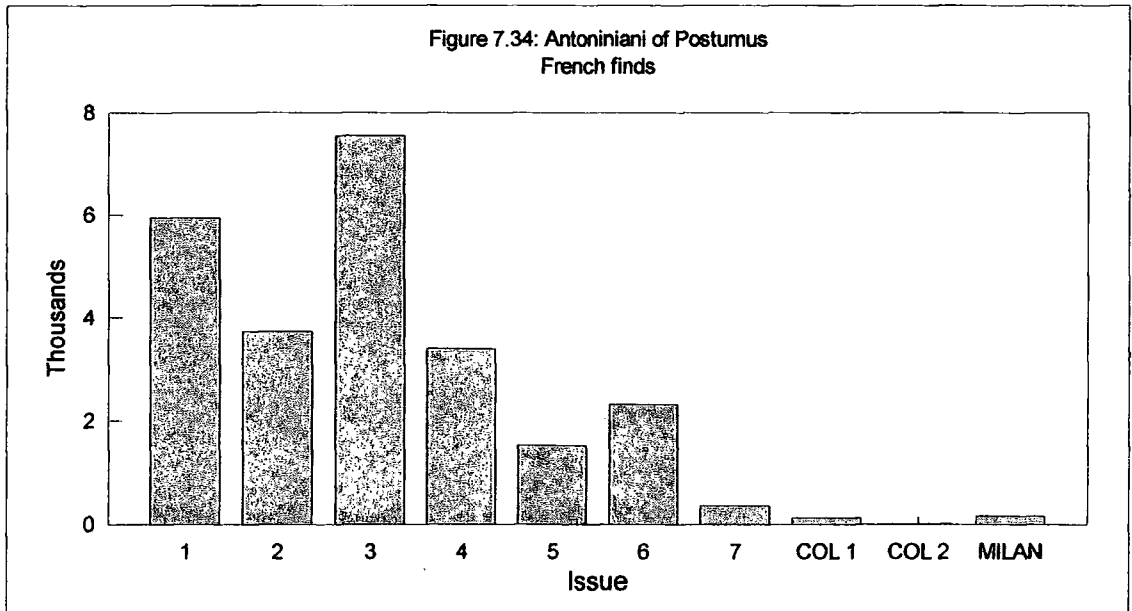


Figure 7.35: Antoniniani of Postumus
Germany/Luxembourg/Austrian finds

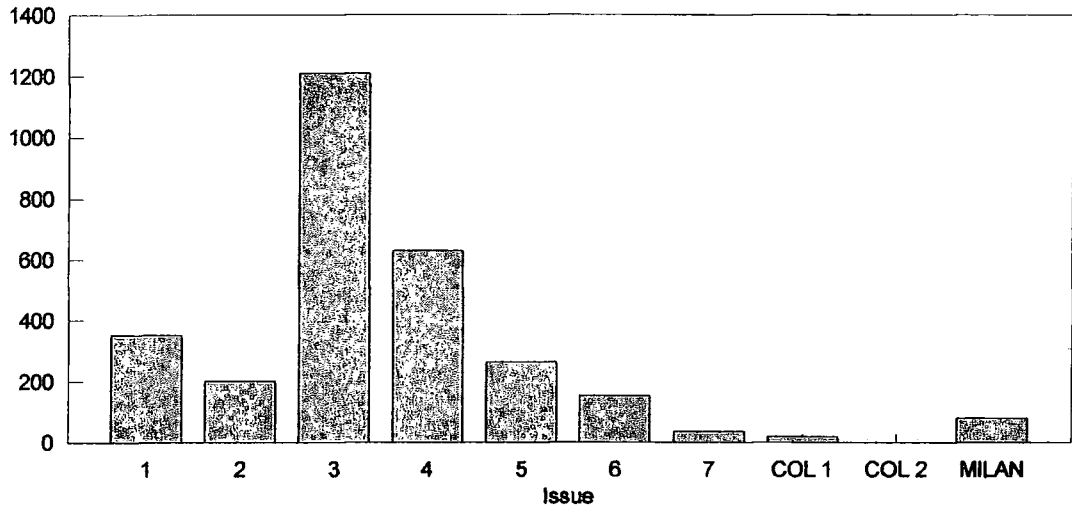


Figure 7.36: Antoniniani of Postumus
Belgian finds

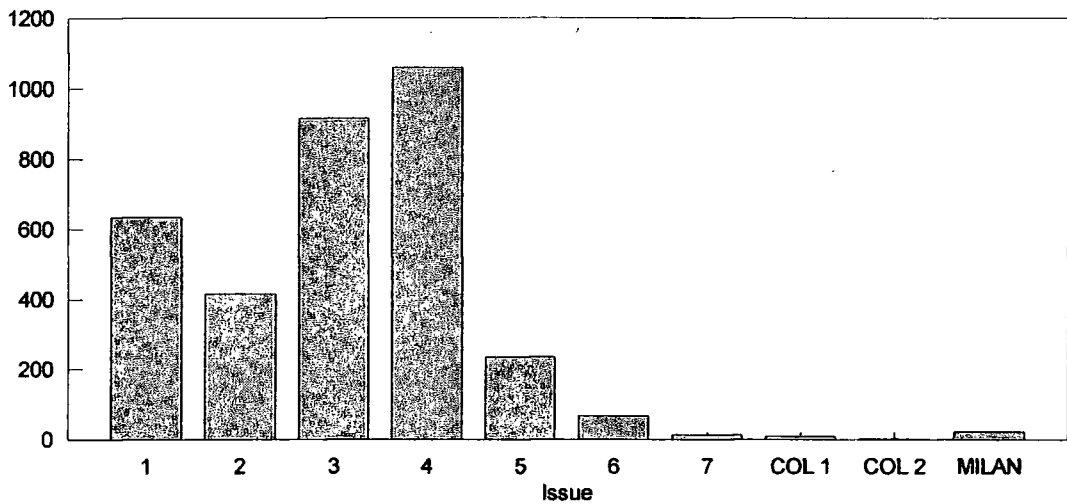
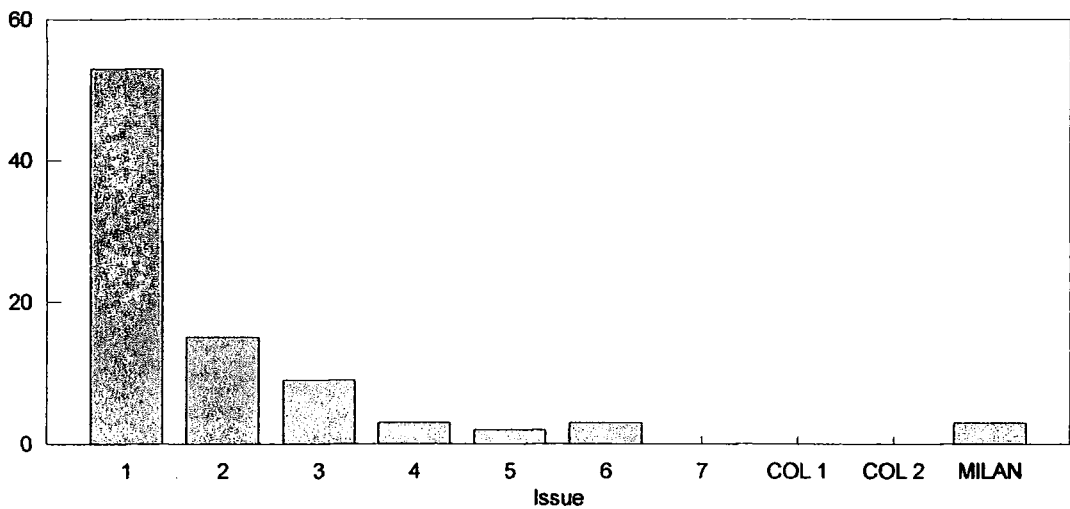
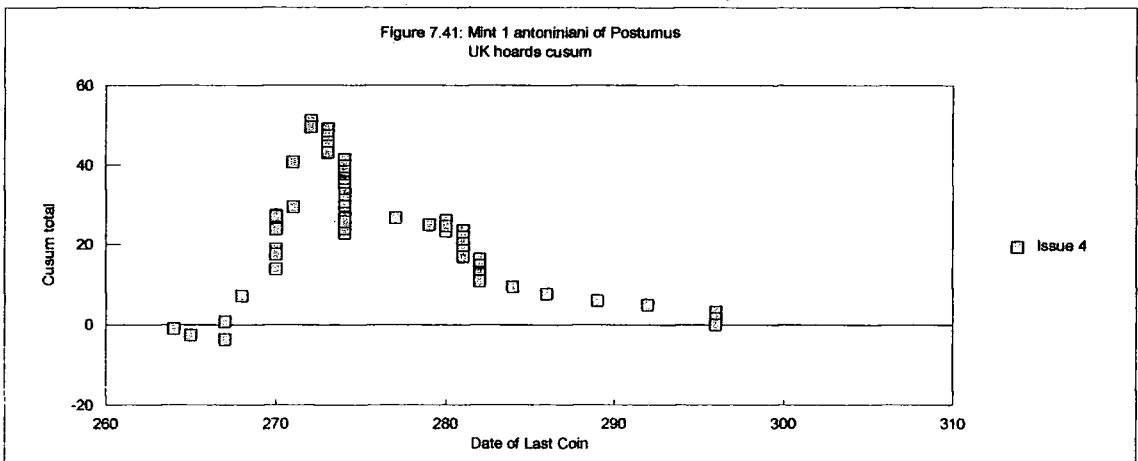
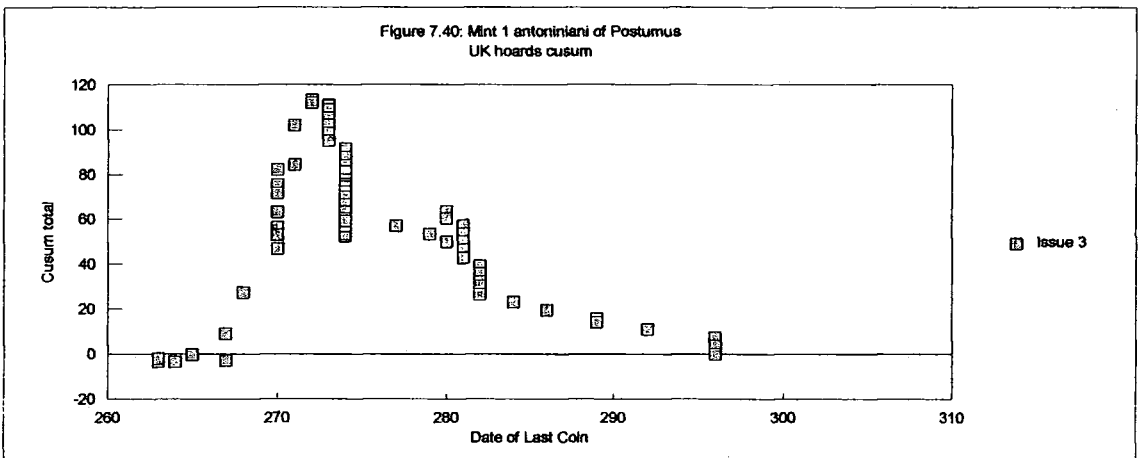
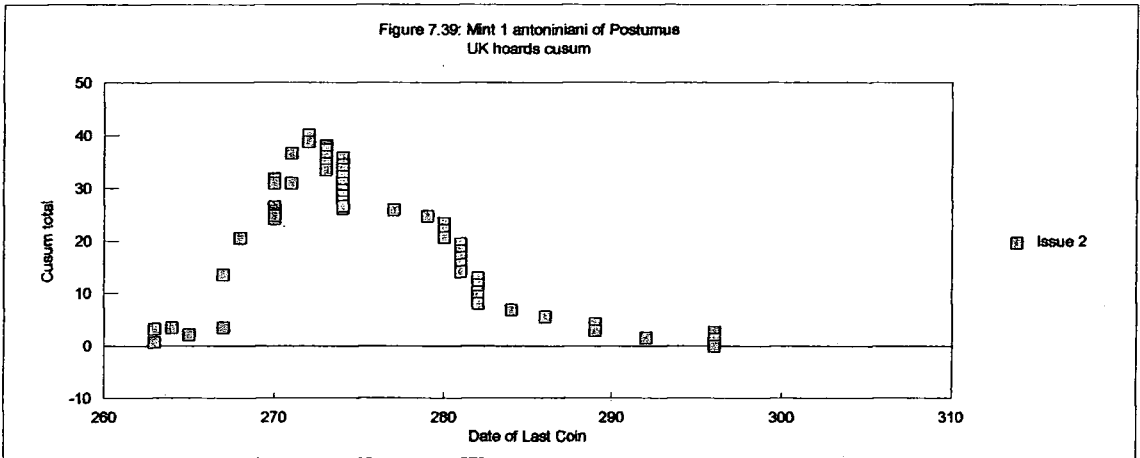
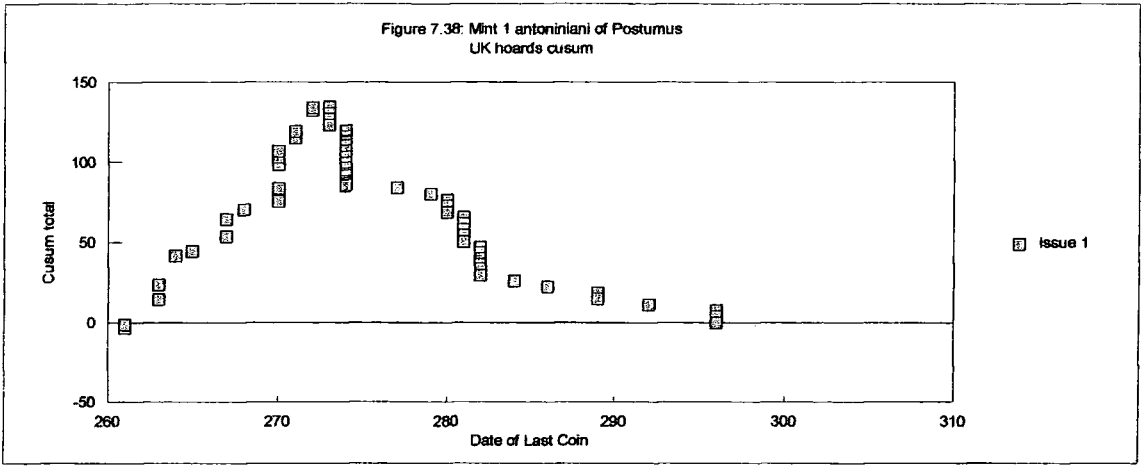


Figure 7.37: Antoniniani of Postumus
Spanish finds





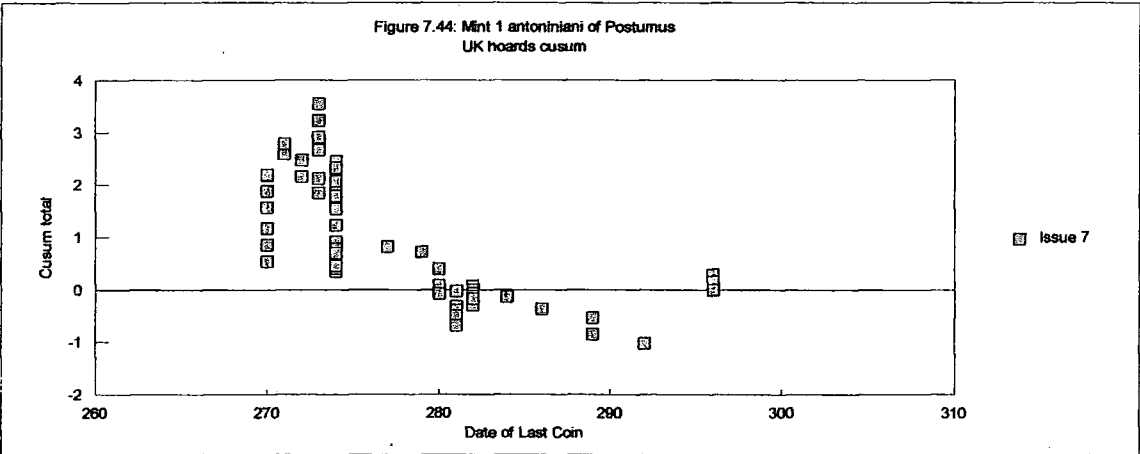
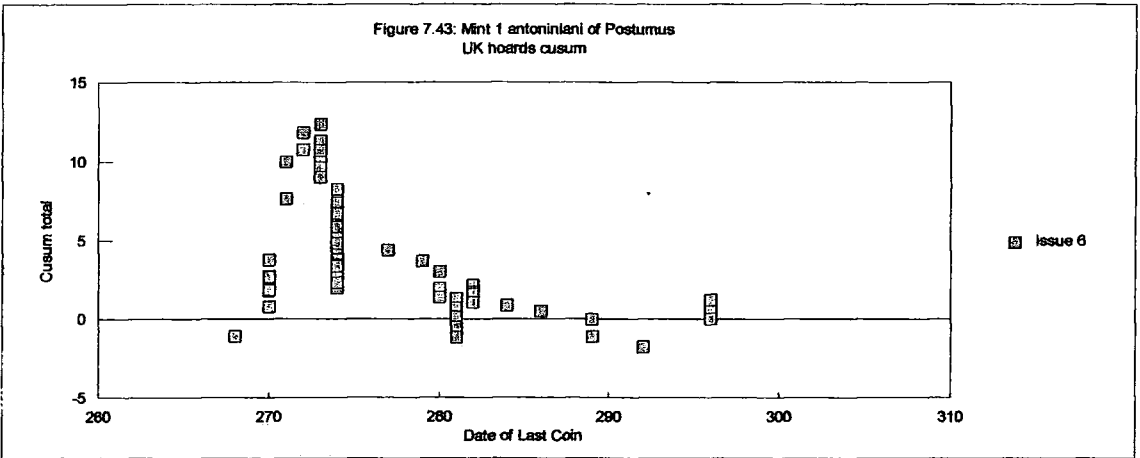
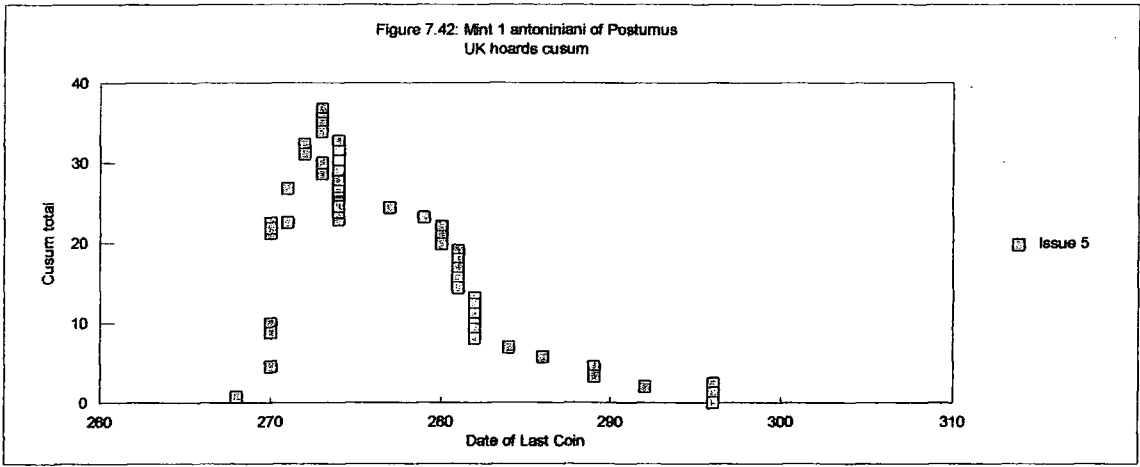


Figure 7.45: Mint 2 (Cologne) antoniniani of Postumus
UK hoards cusum

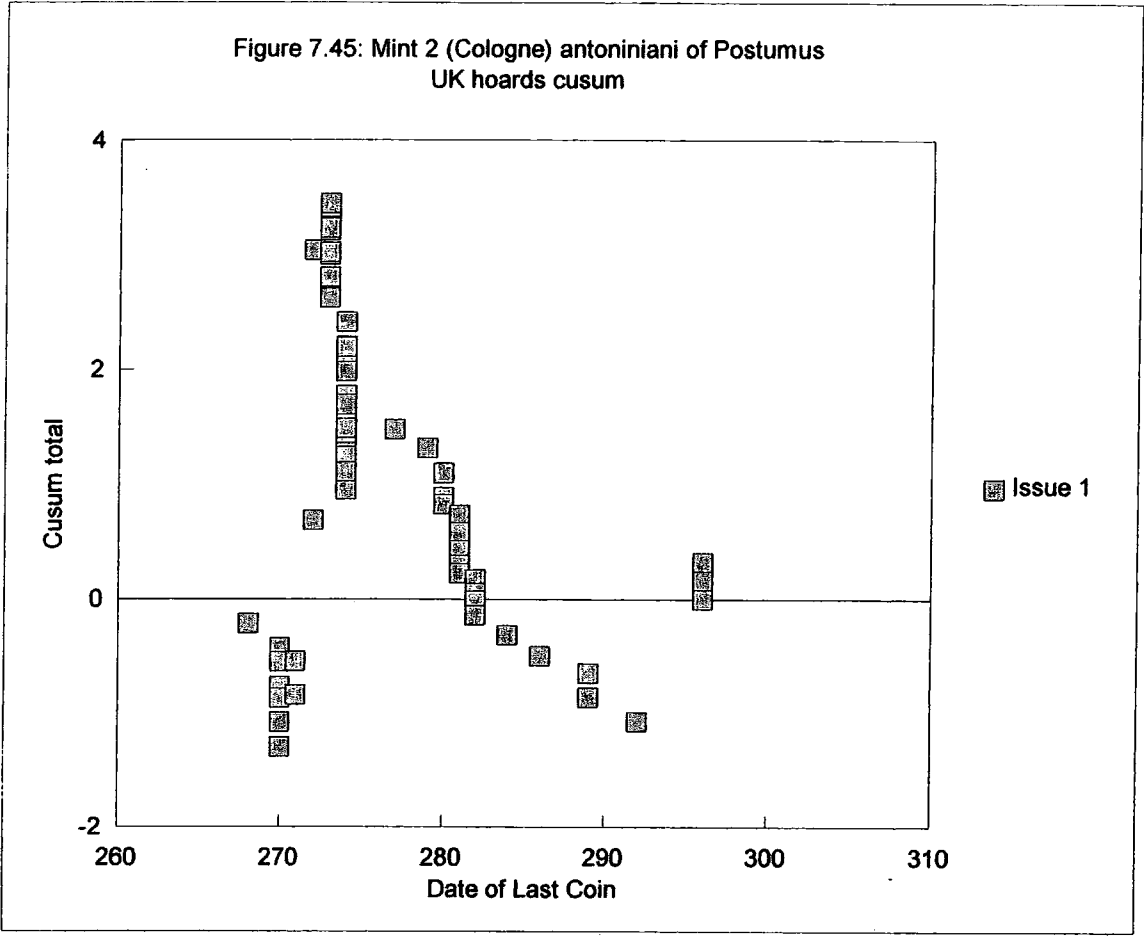
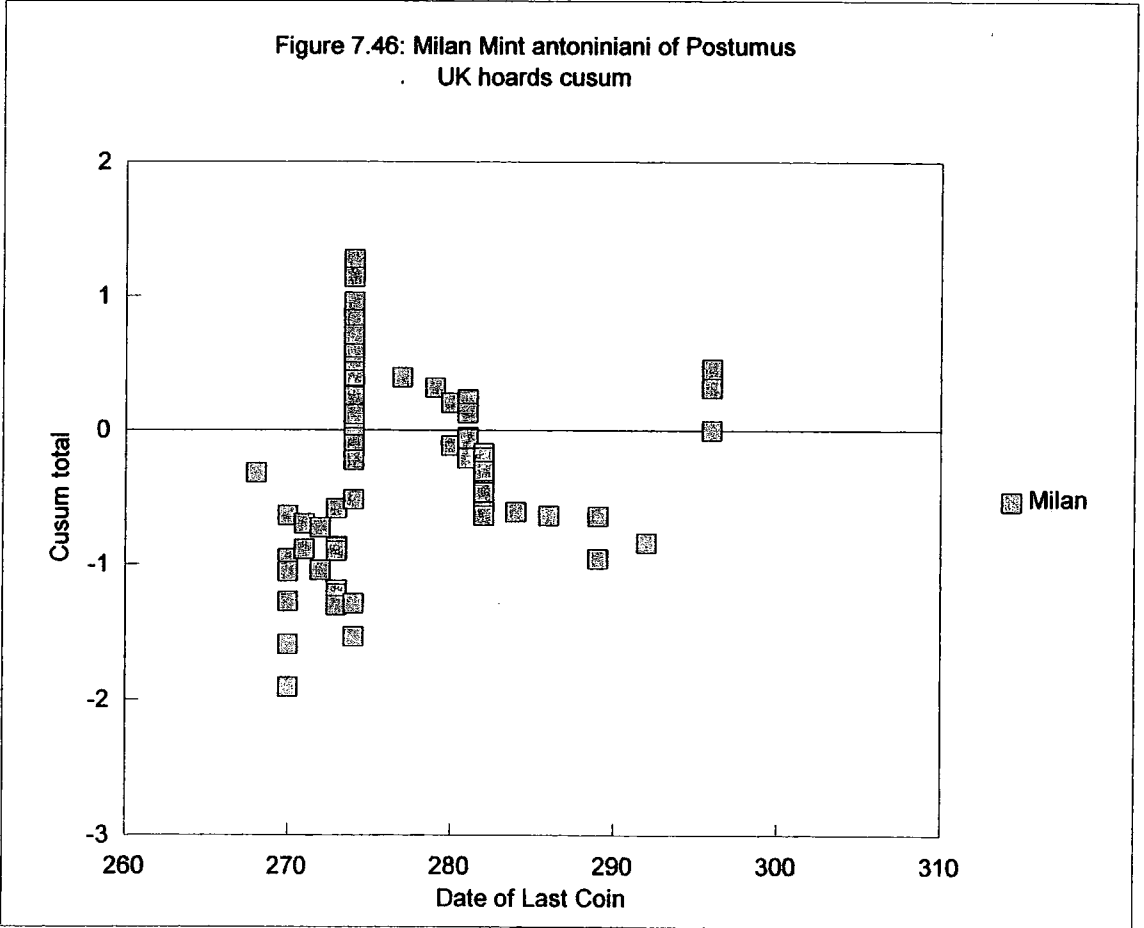
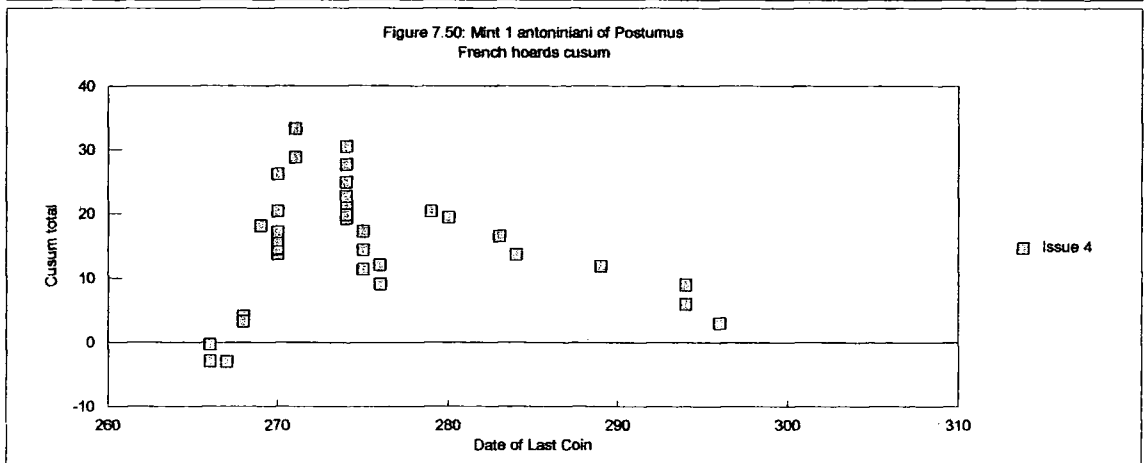
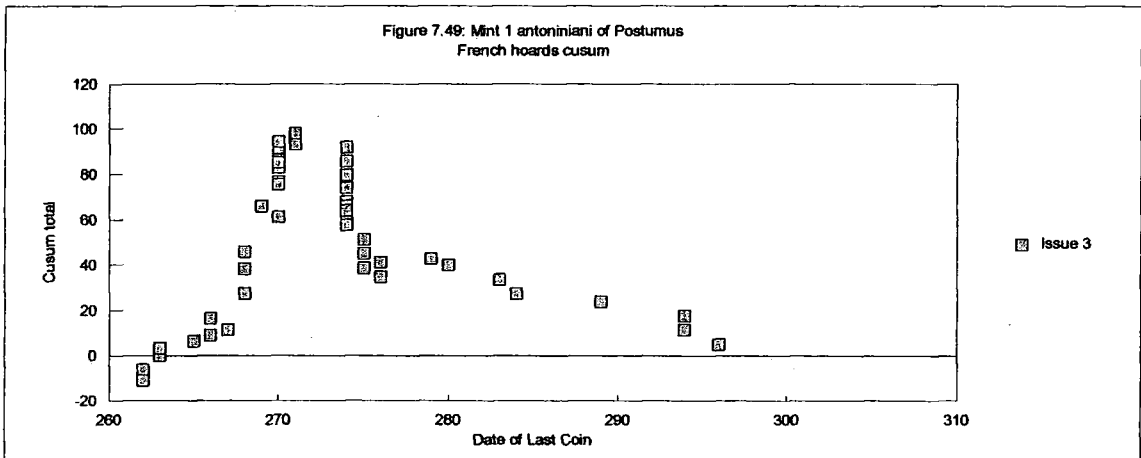
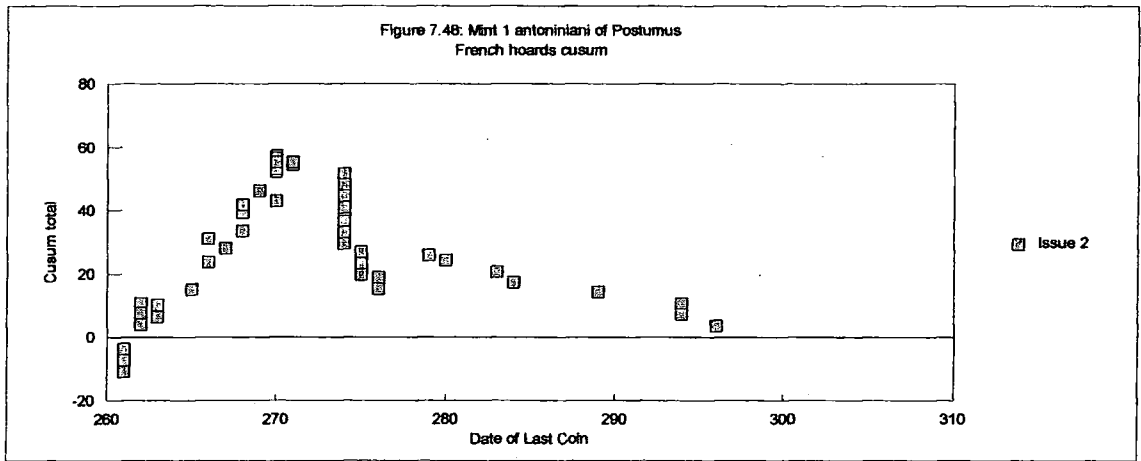
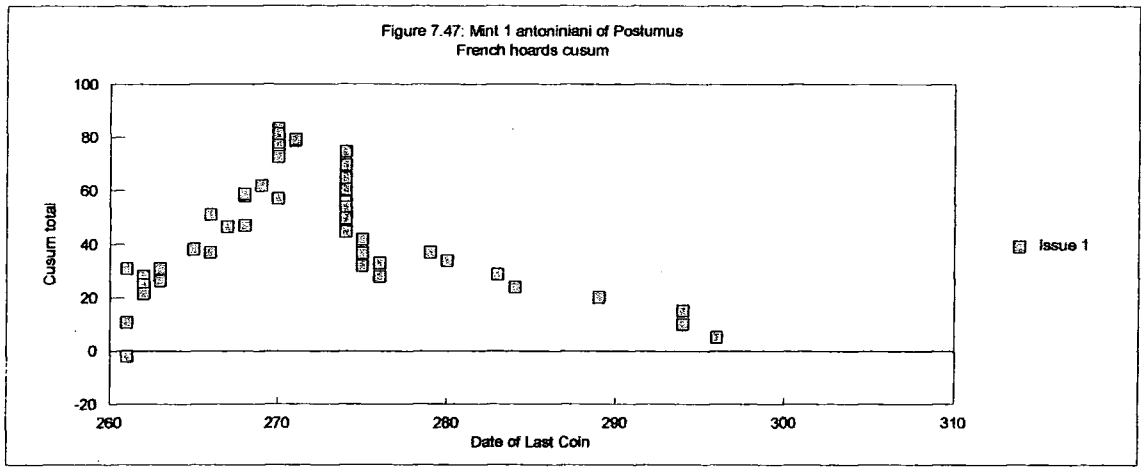


Figure 7.46: Milan Mint antoniniani of Postumus
UK hoards cusum





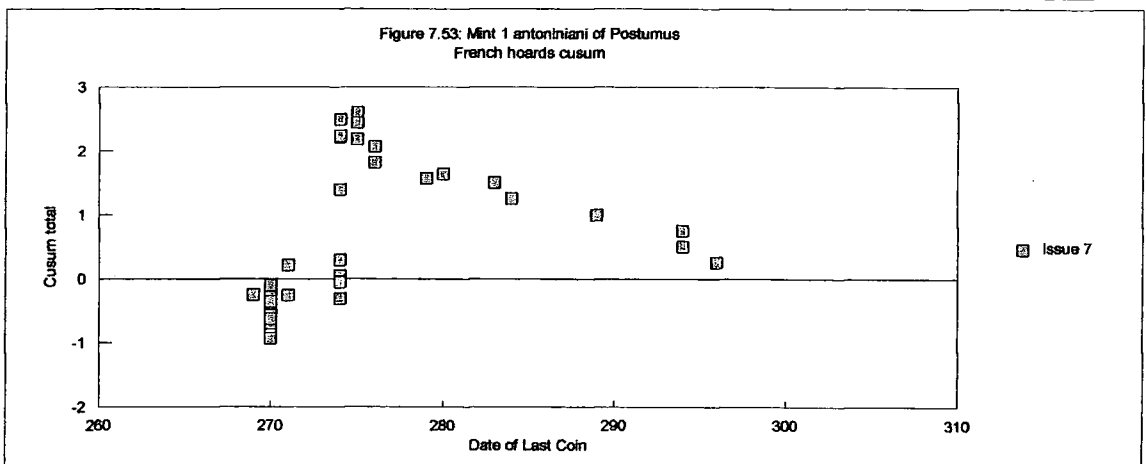
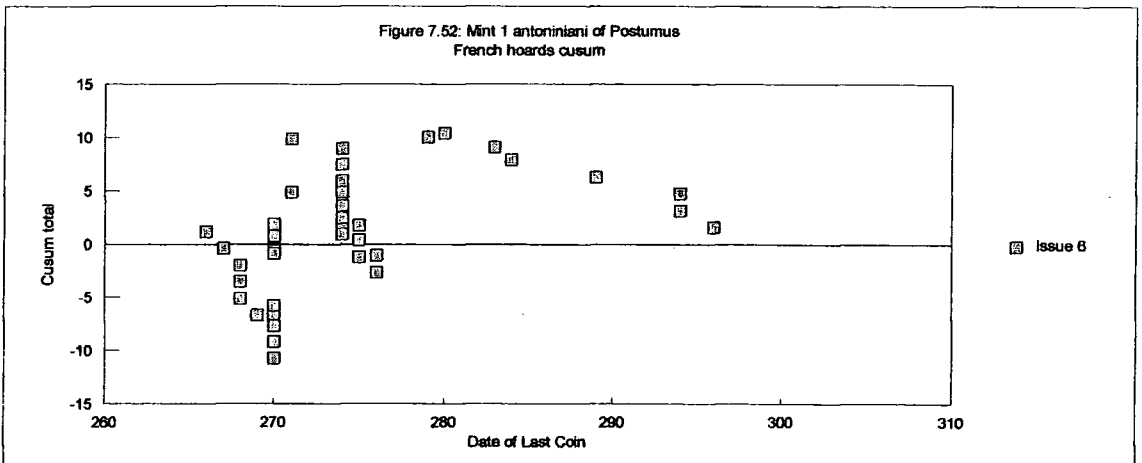
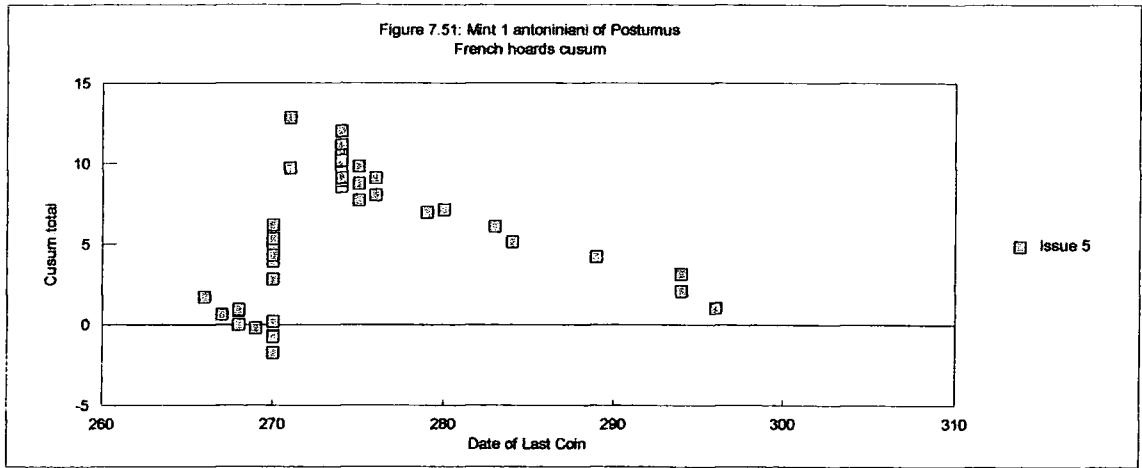


Figure 7.54: Mint 2 (Cologne) antoniniani of Postumus
French hoards cusum

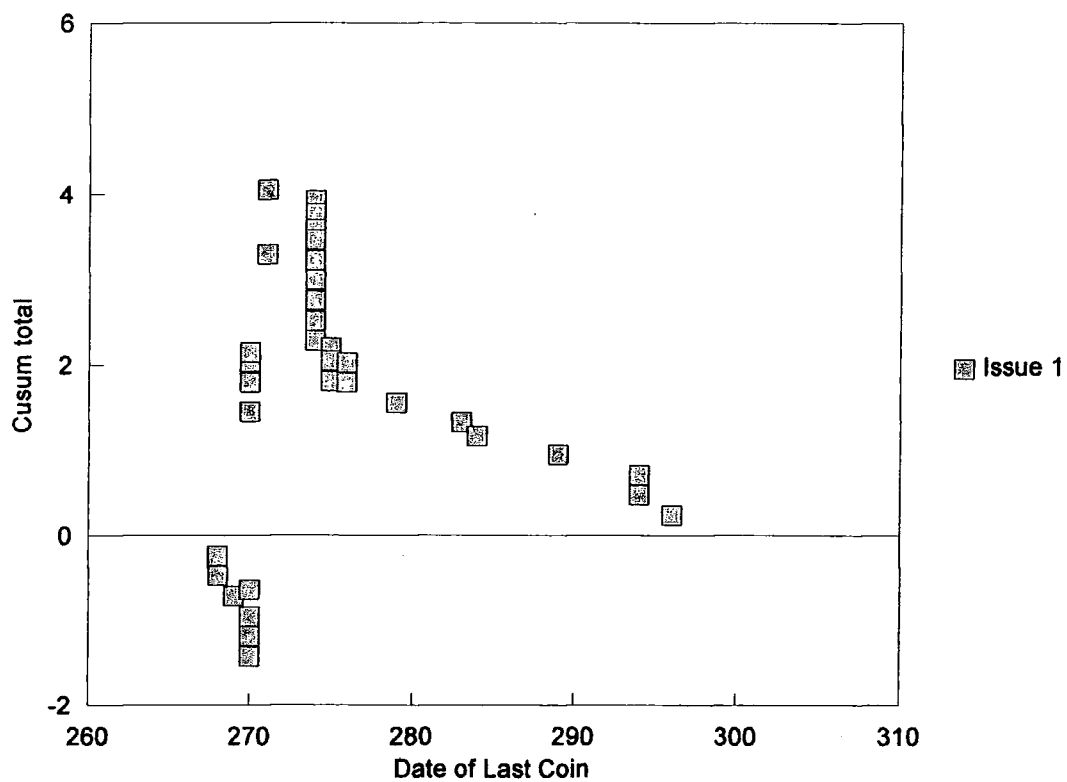


Figure 7.55: Milan Mint antoniniani of Postumus
French hoards cusum

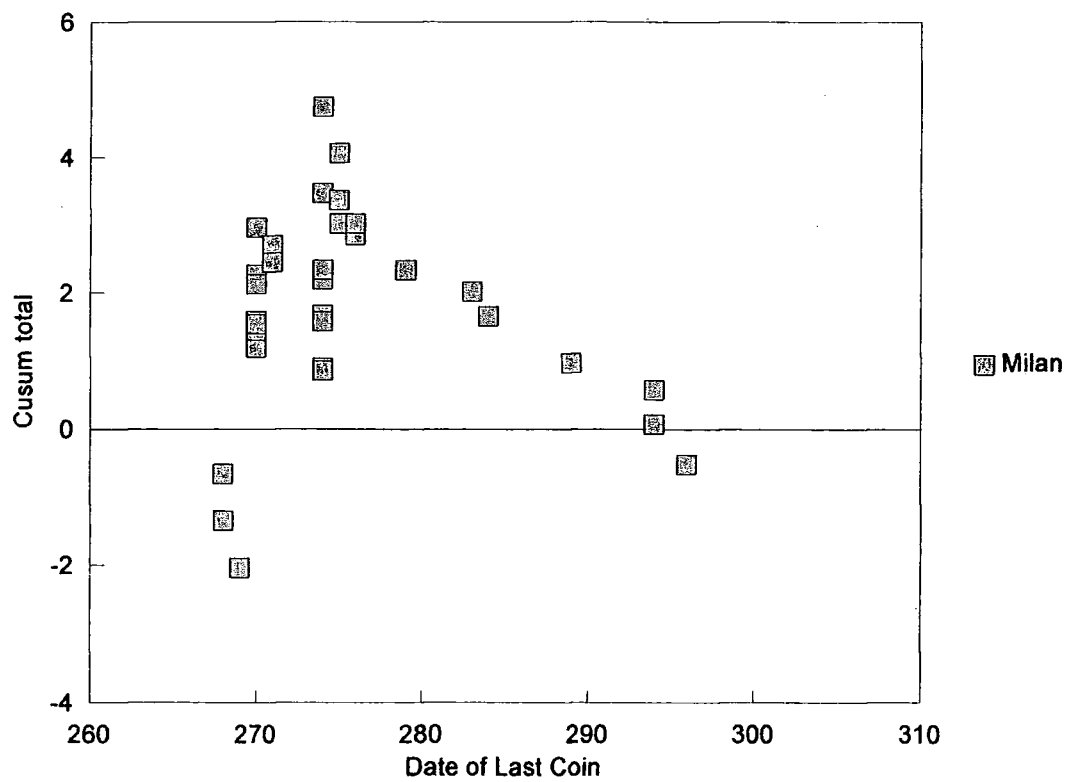


Figure 7.56: Mint 1 antoniniani of Victorinus
Overall

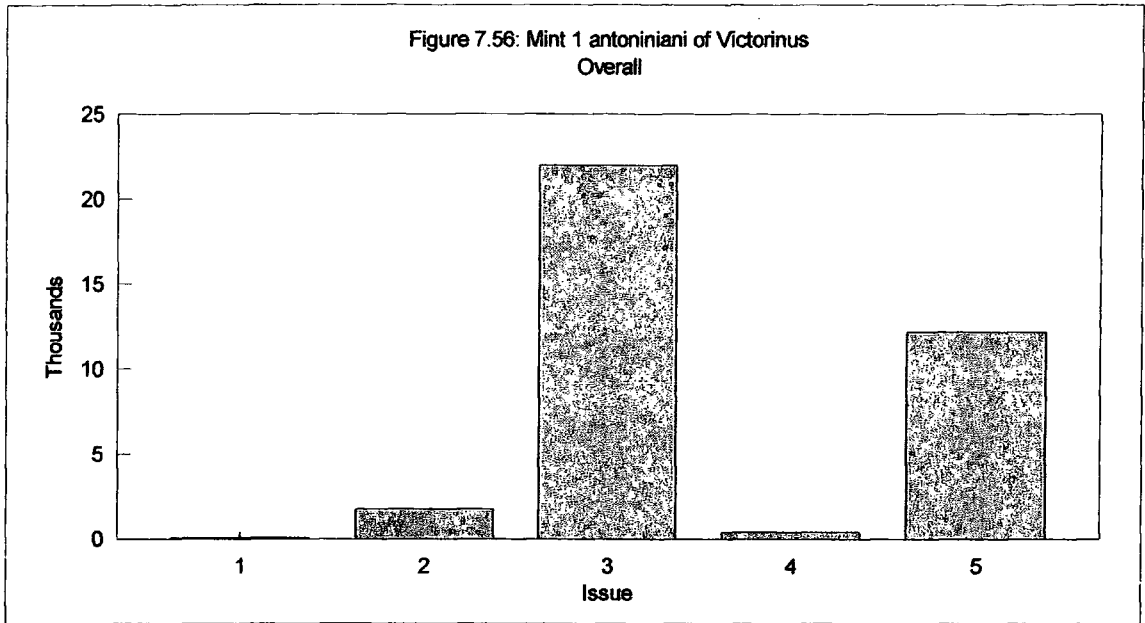


Figure 7.57: Mint 1 antoniniani of Victorinus
UK finds

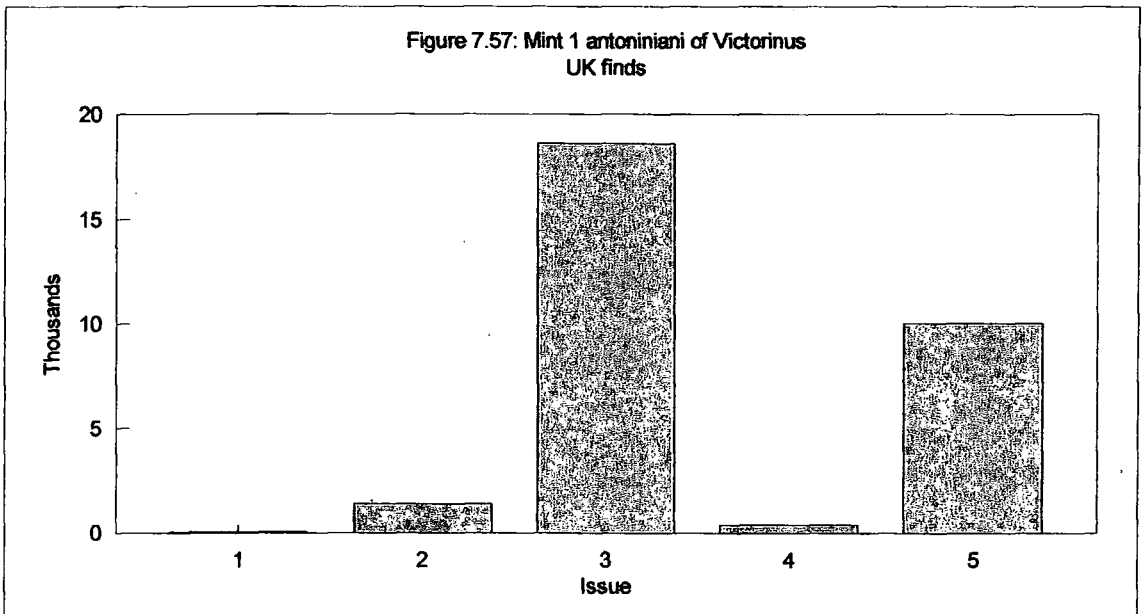


Figure 7.58: Mint 1 antoniniani of Victorinus
French/Belgian/Netherlands finds

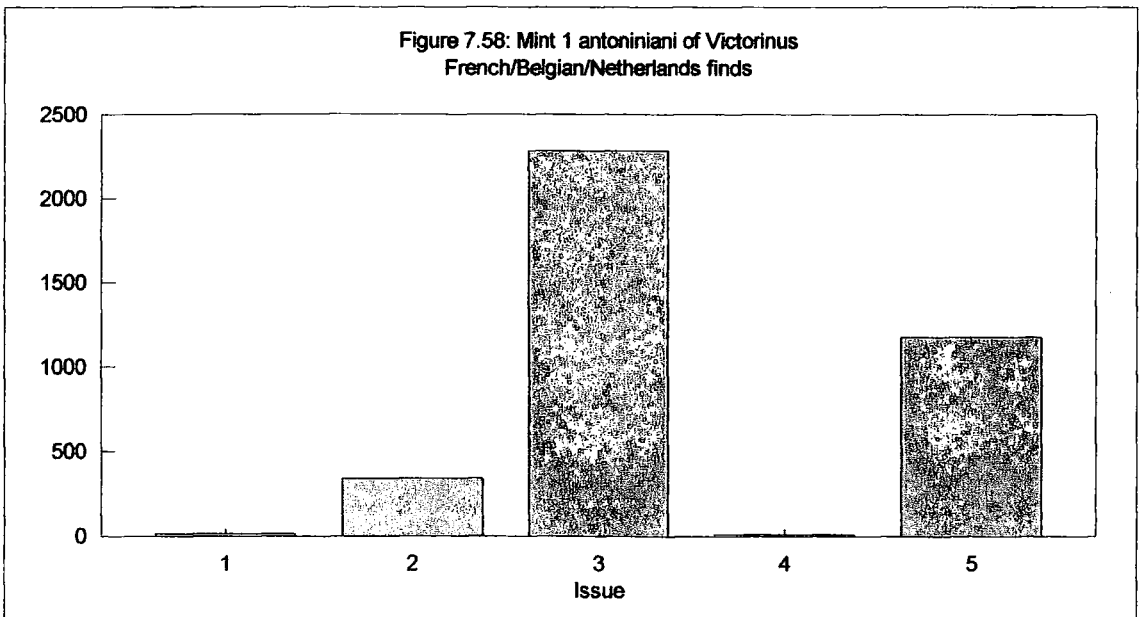


Figure 7.59: Mint 1 antoniniani of Victorinus
German/ Swiss/Luxembourg/Austrian finds

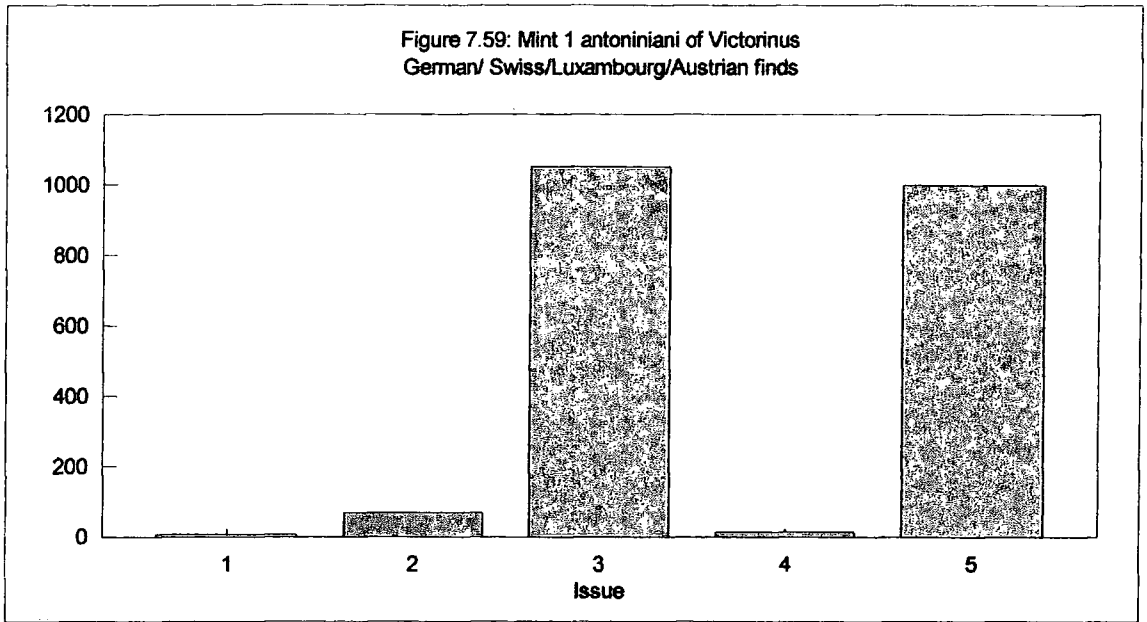
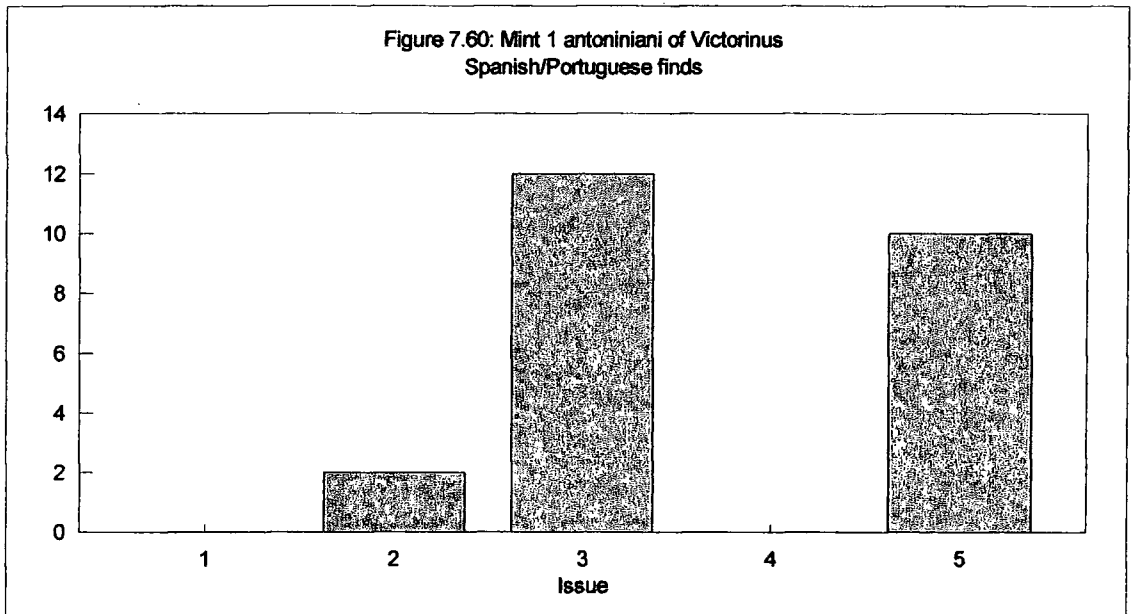


Figure 7.60: Mint 1 antoniniani of Victorinus
Spanish/Portuguese finds



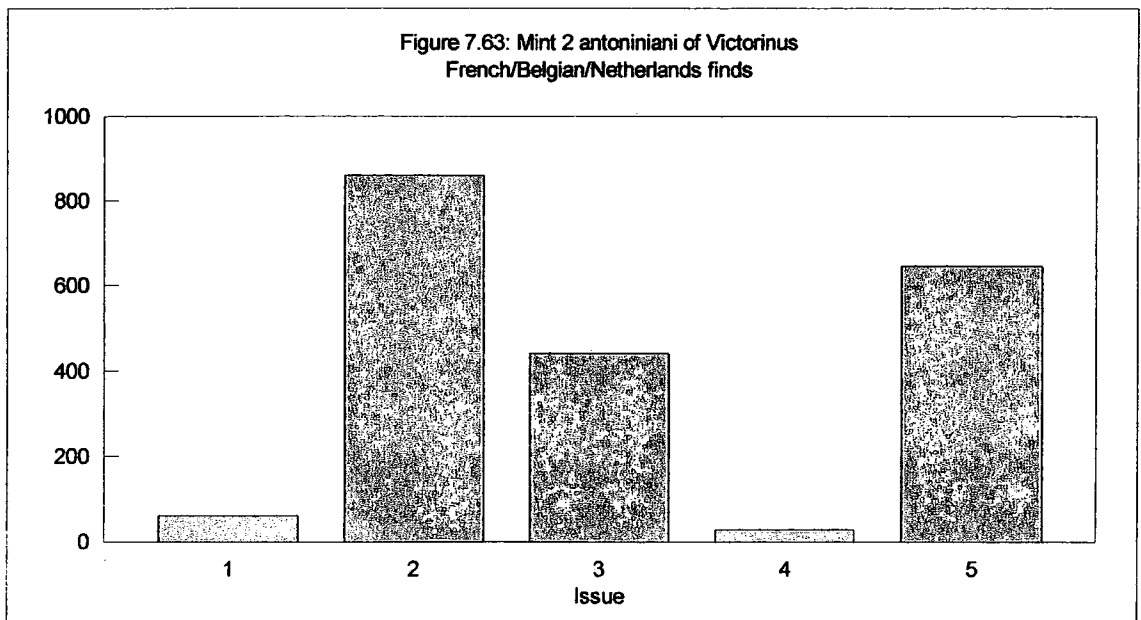
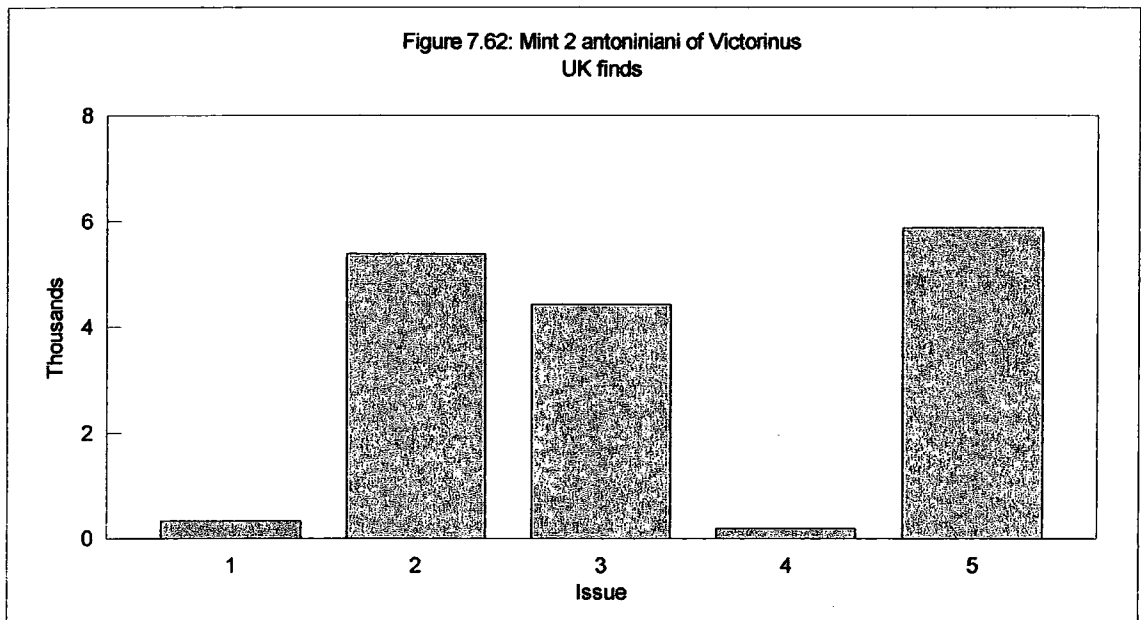
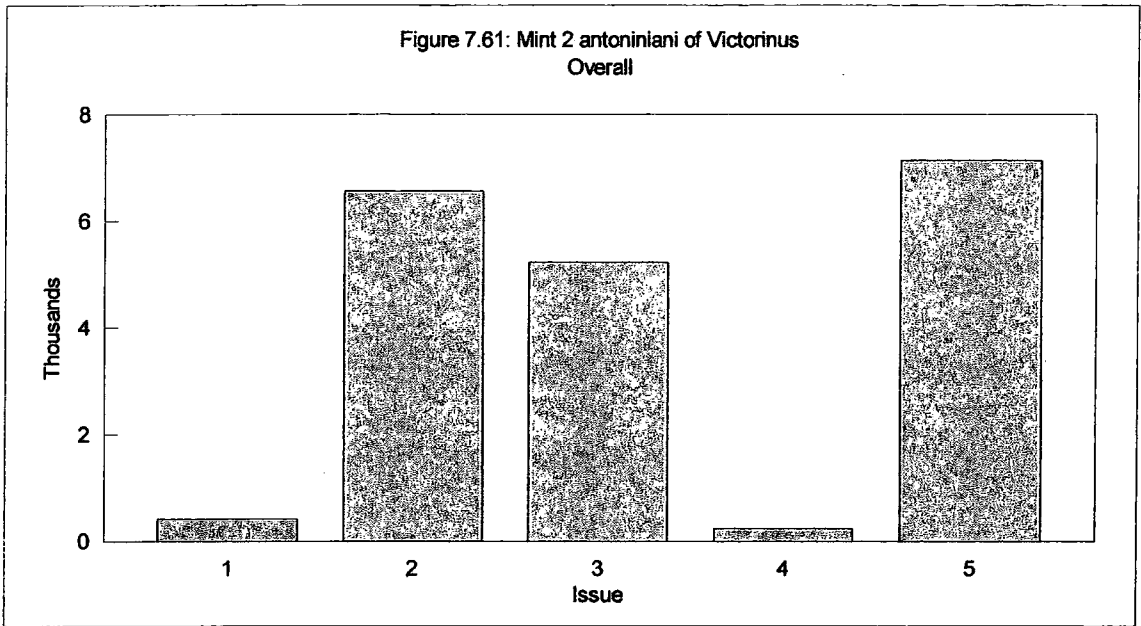


Figure 7.64: Mint 2 antoniniani of Victorinus
German/Swiss/Luxembourg/Austrian finds

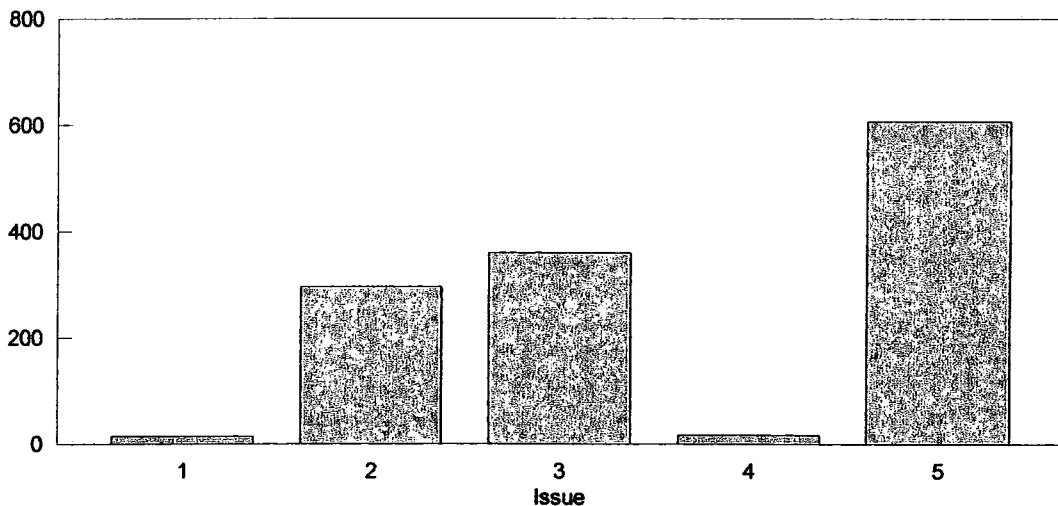
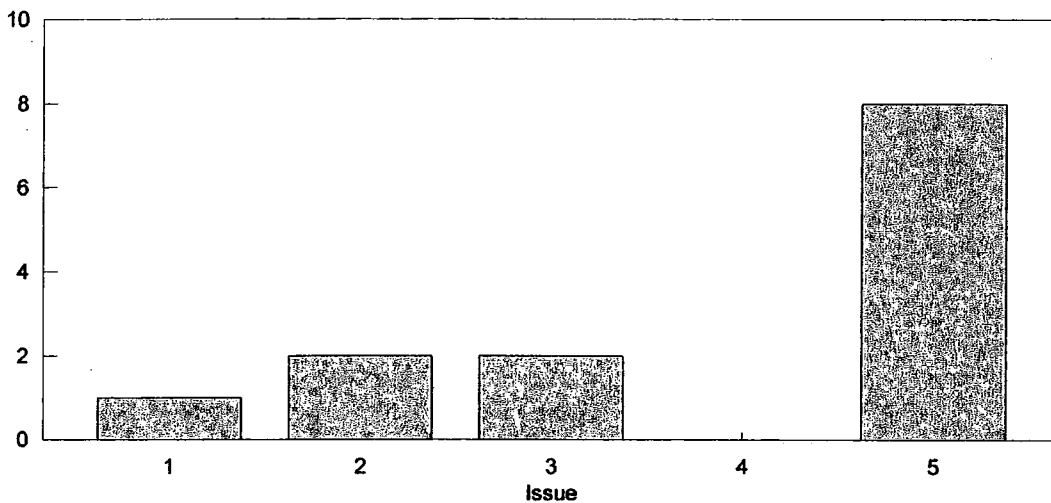
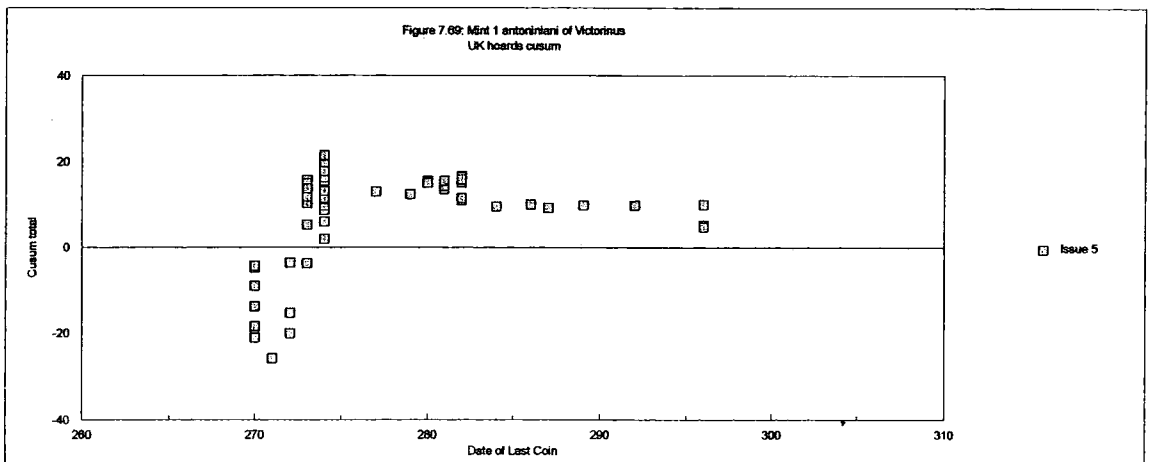
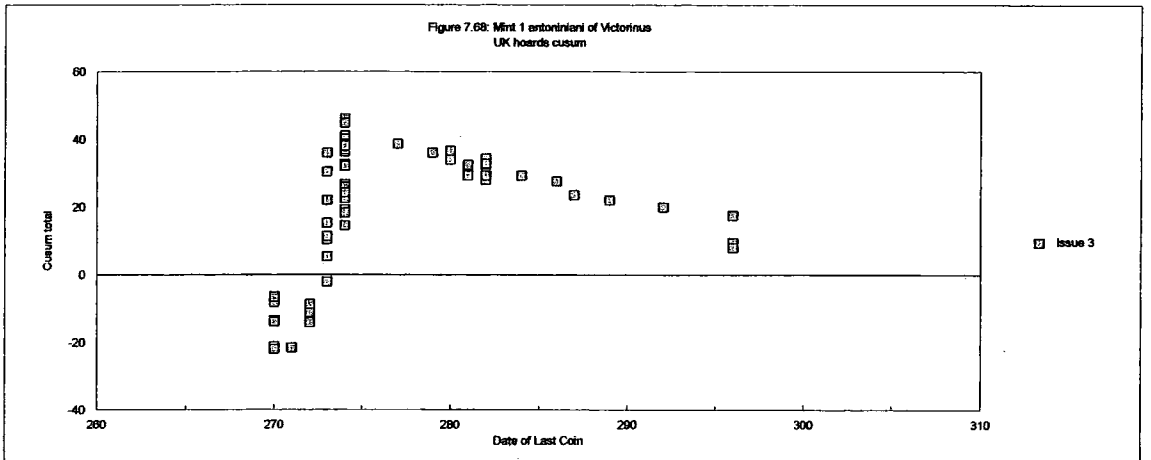
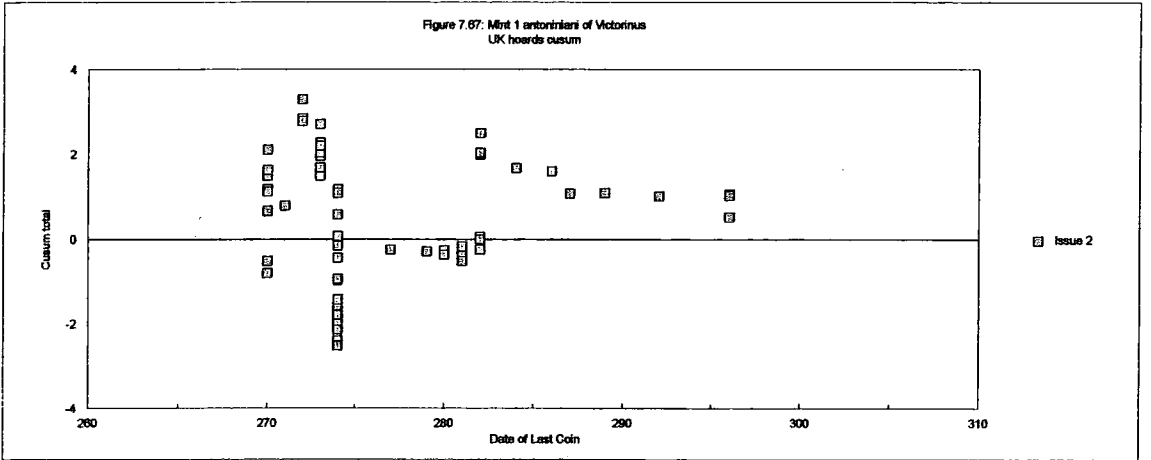
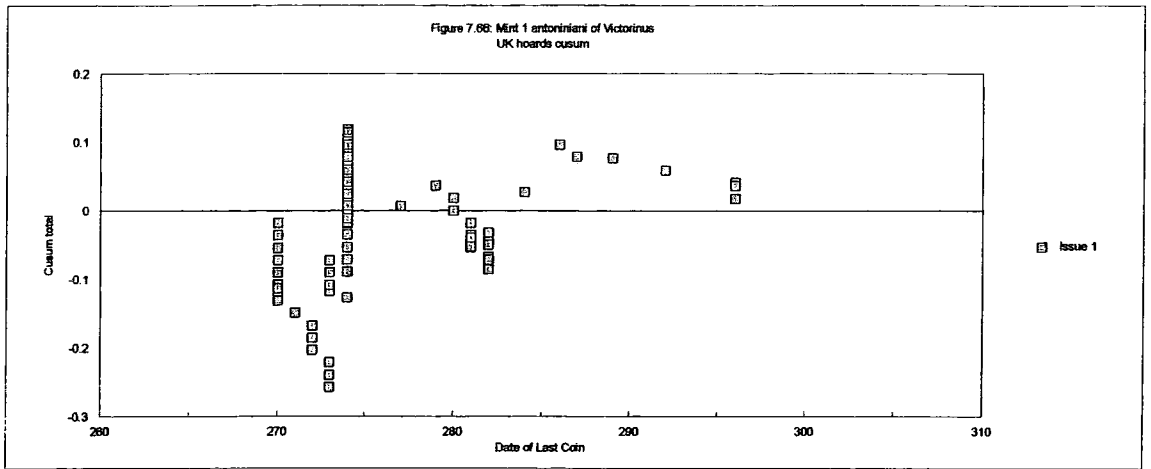
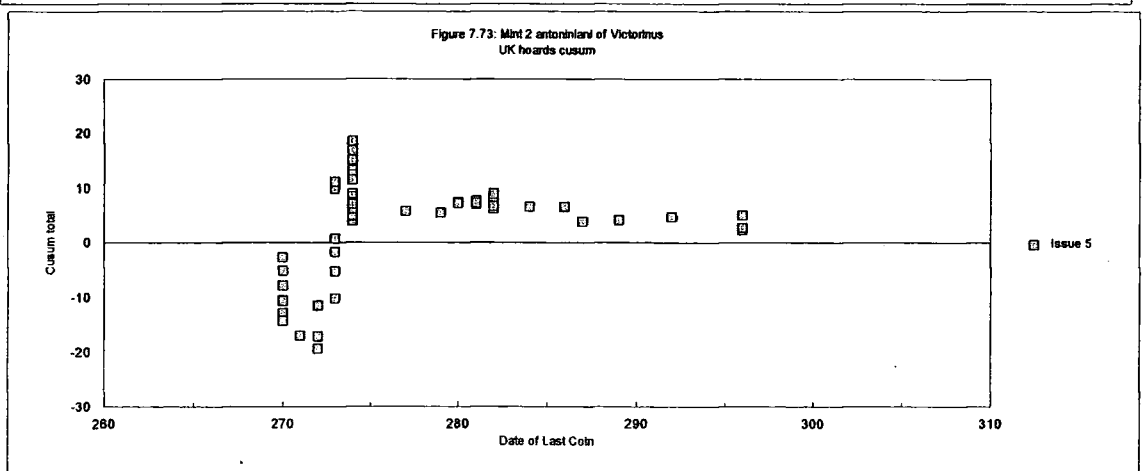
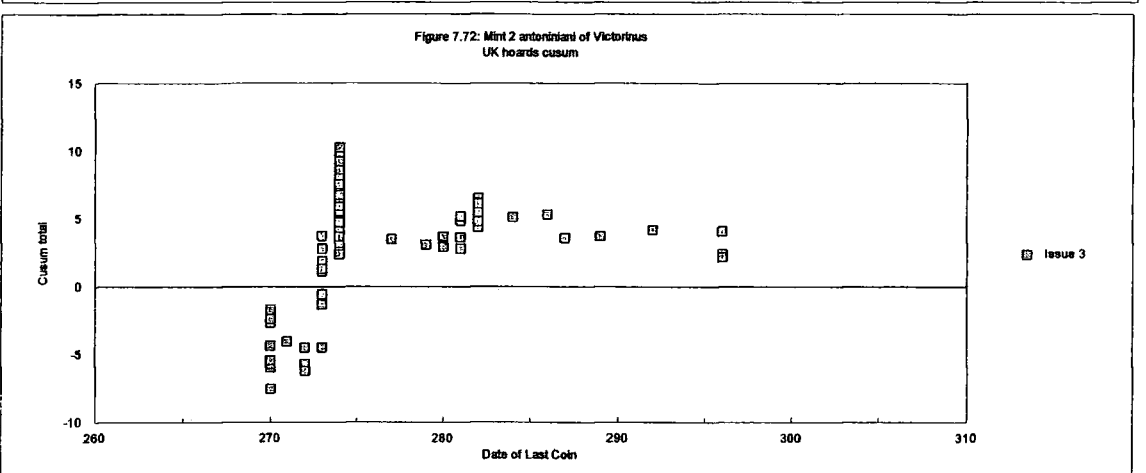
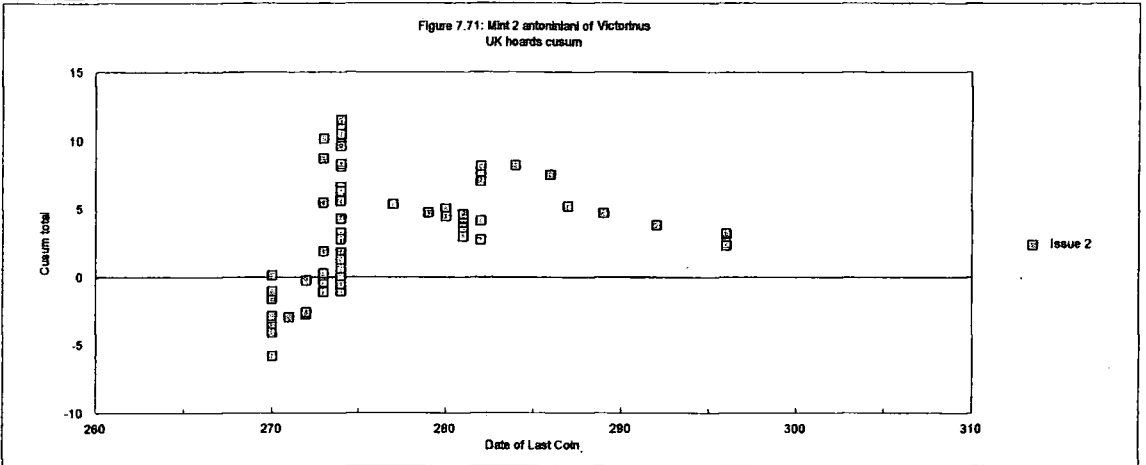
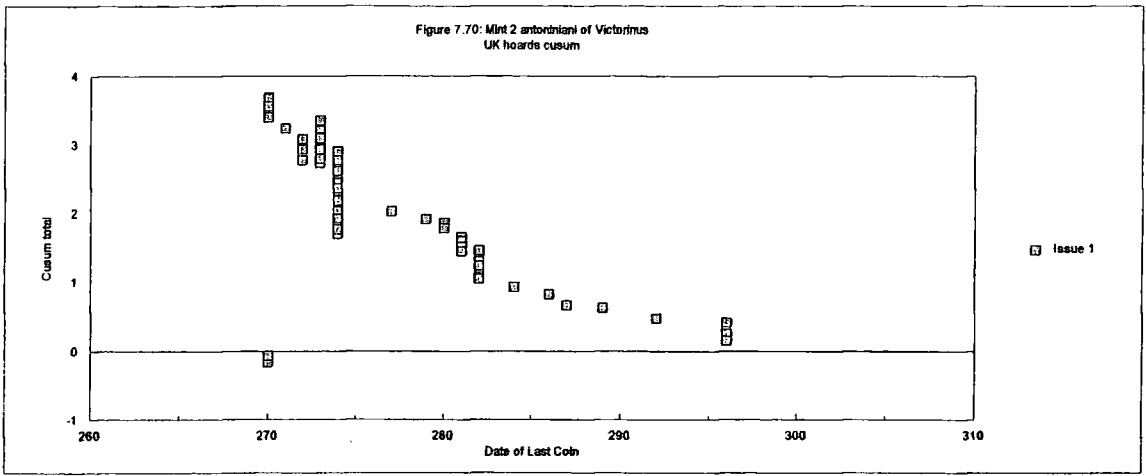
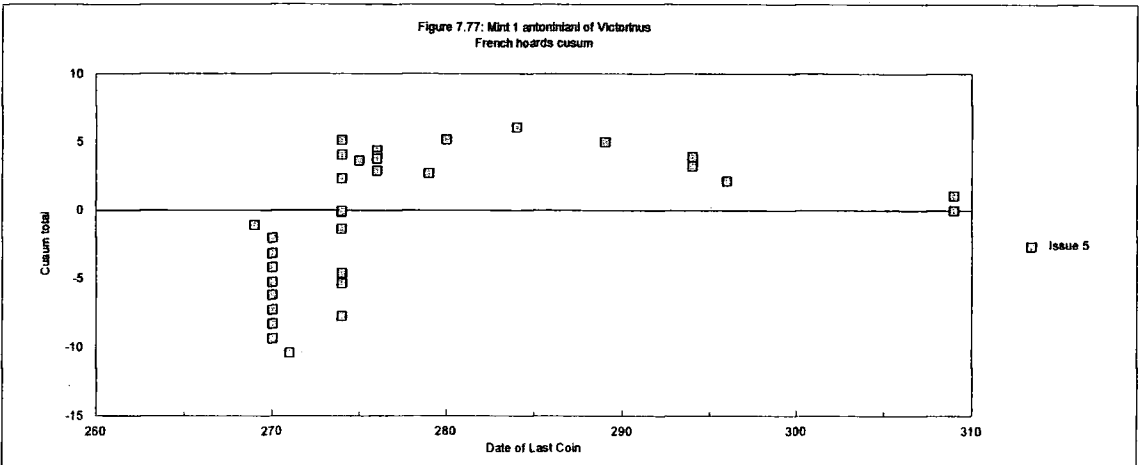
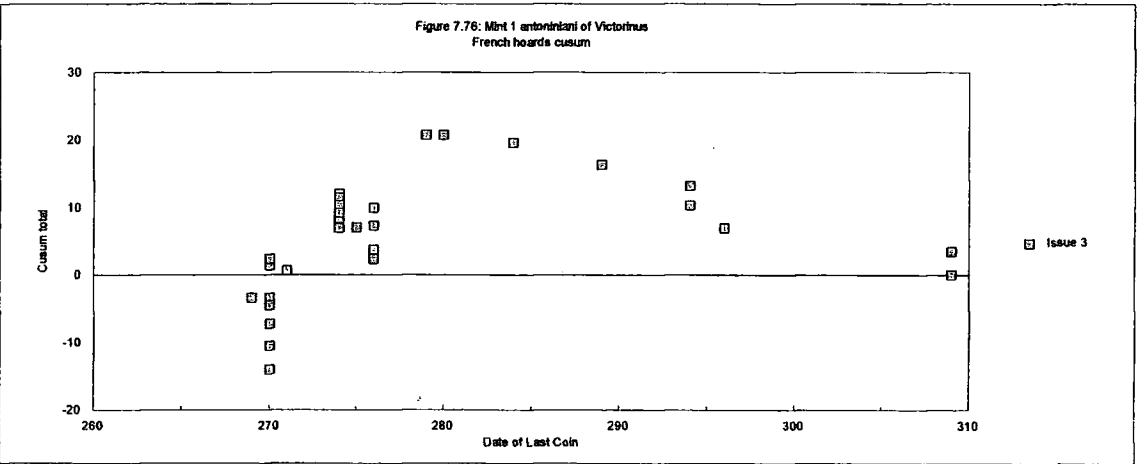
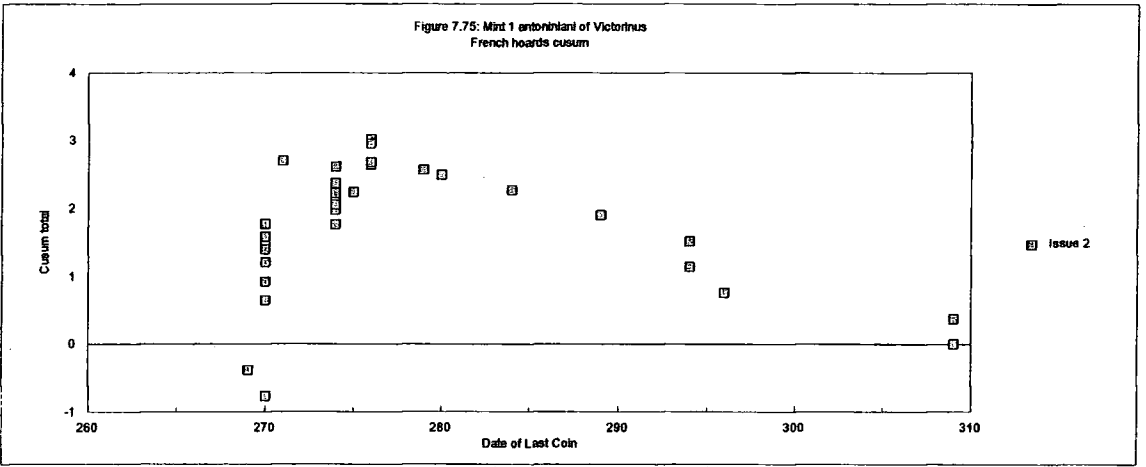
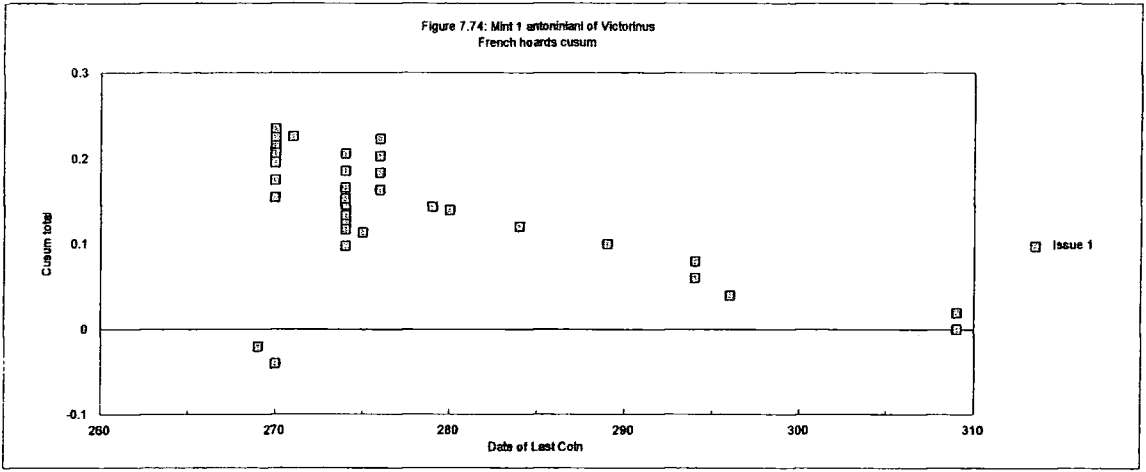


Figure 7.65: Mint 2 antoniniani of Victorinus
Spanish/Portuguese finds









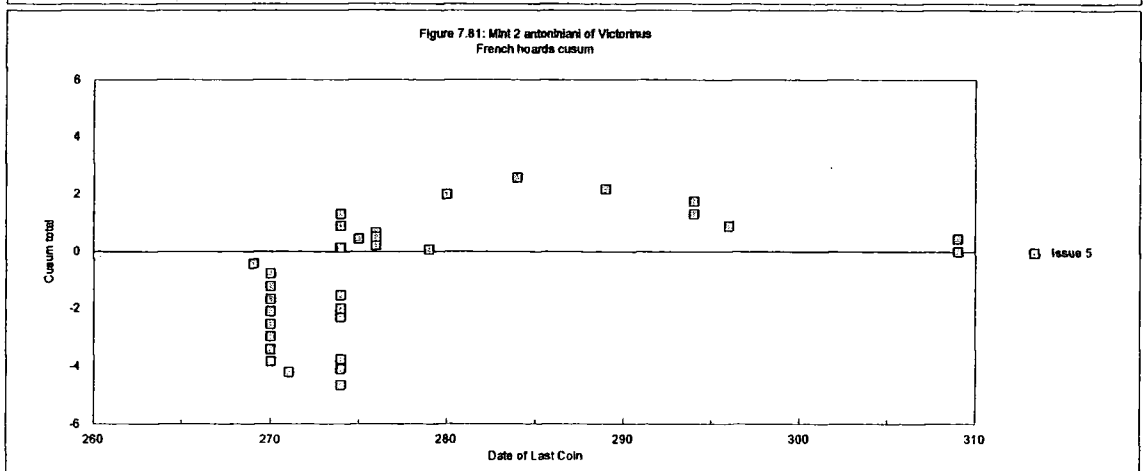
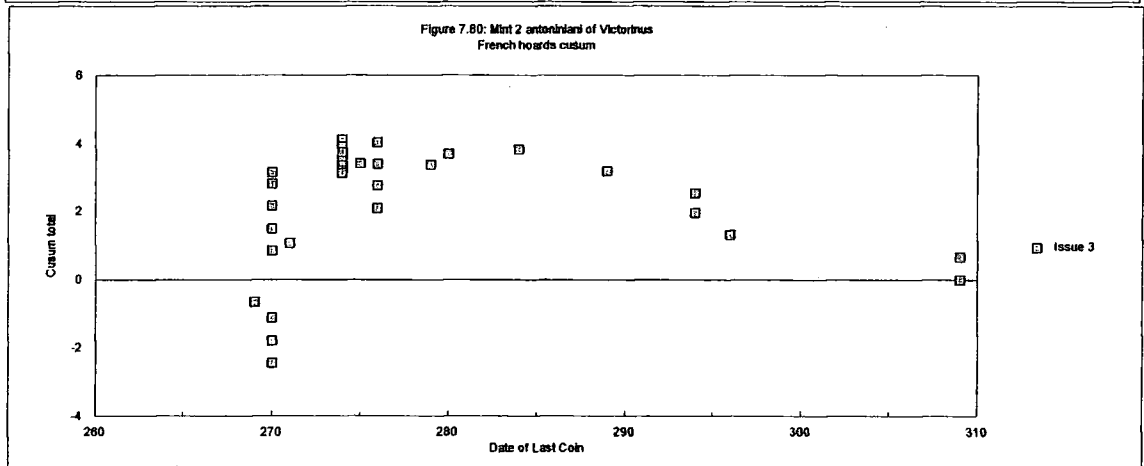
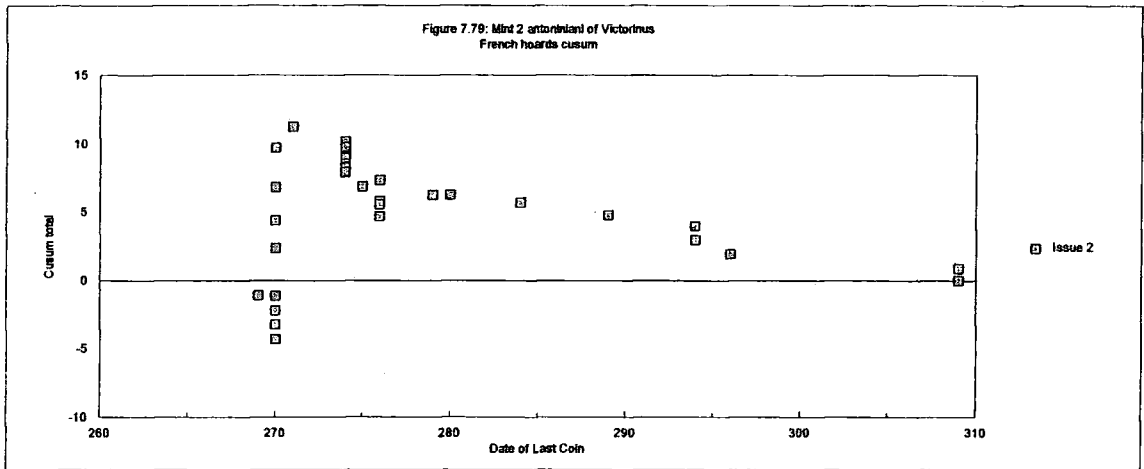
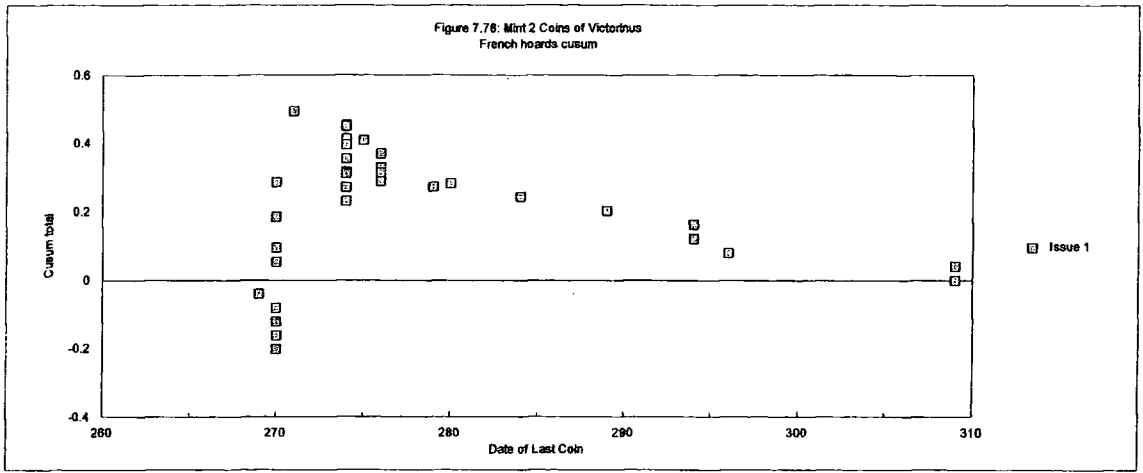


Figure 7.82: Mint 1 antoniniani of Tetricus I
Overall

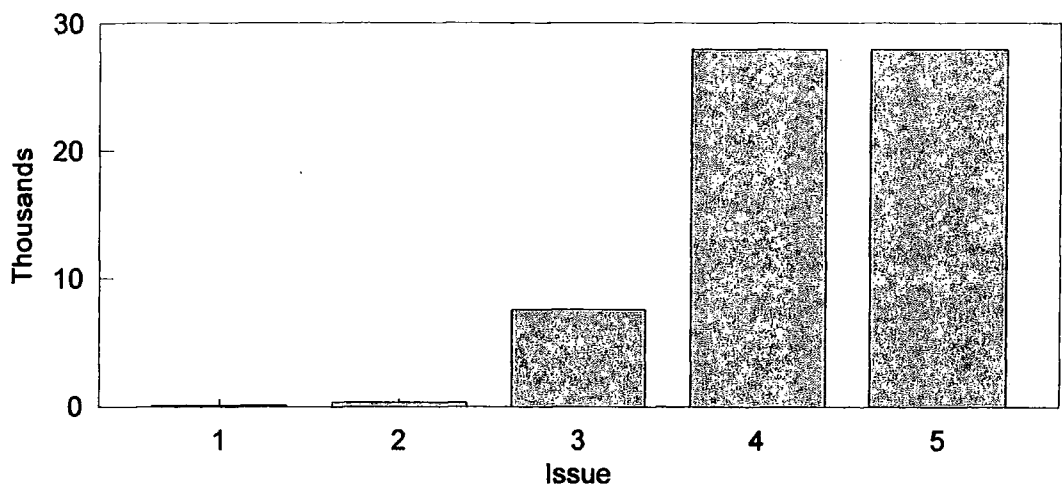


Figure 7.83: Mint 1 antoniniani of Tetricus I
UK finds

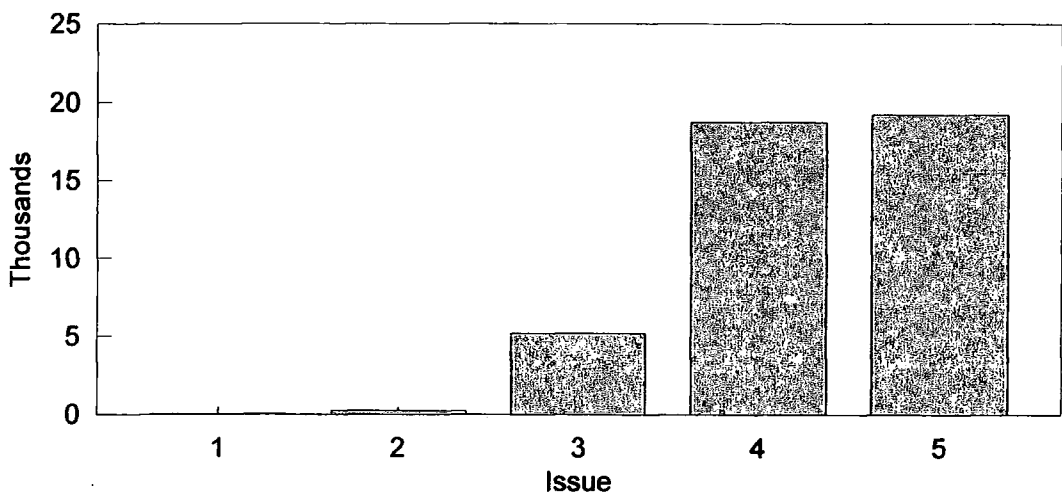


Figure 7.84: Mint 1 antoniniani of Tetricus I
French/ Belgian/ Netherlands finds

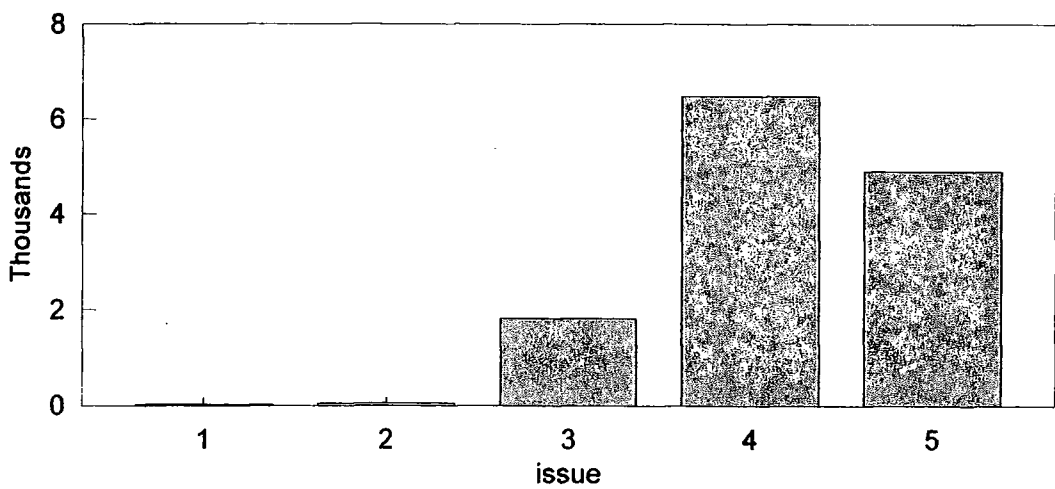


Figure 7.85: Mint 1 antoniniani of Tetricus I
German/ Luxembourg/ Austrian/ Swiss finds

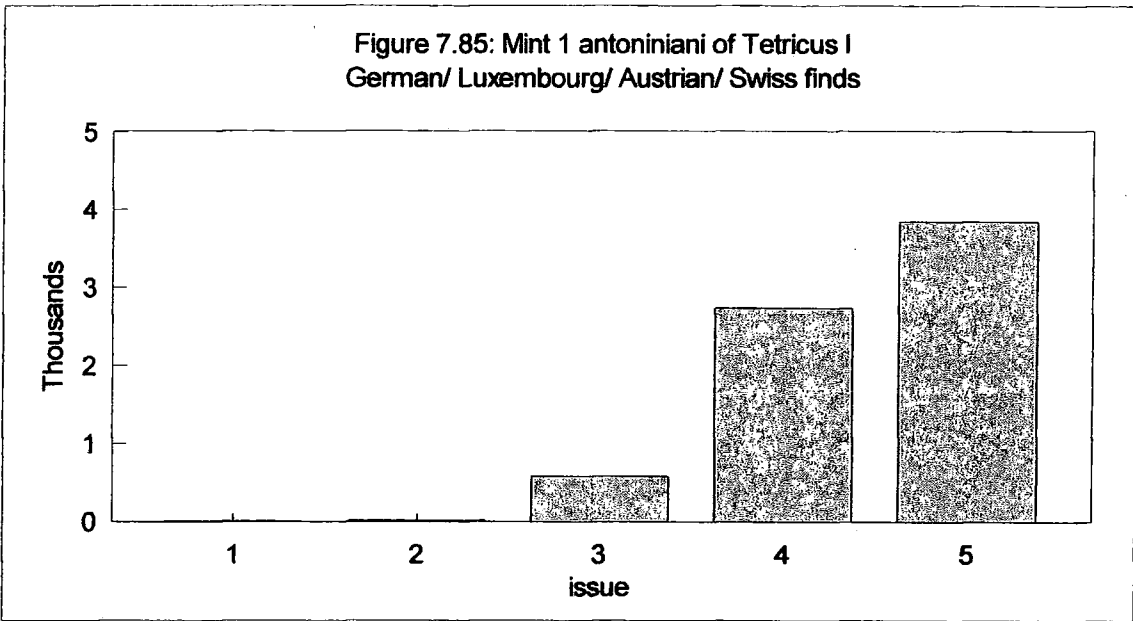


Figure 7.86: Mint 1 antoniniani of Tetricus I
Spanish/ Portuguese finds

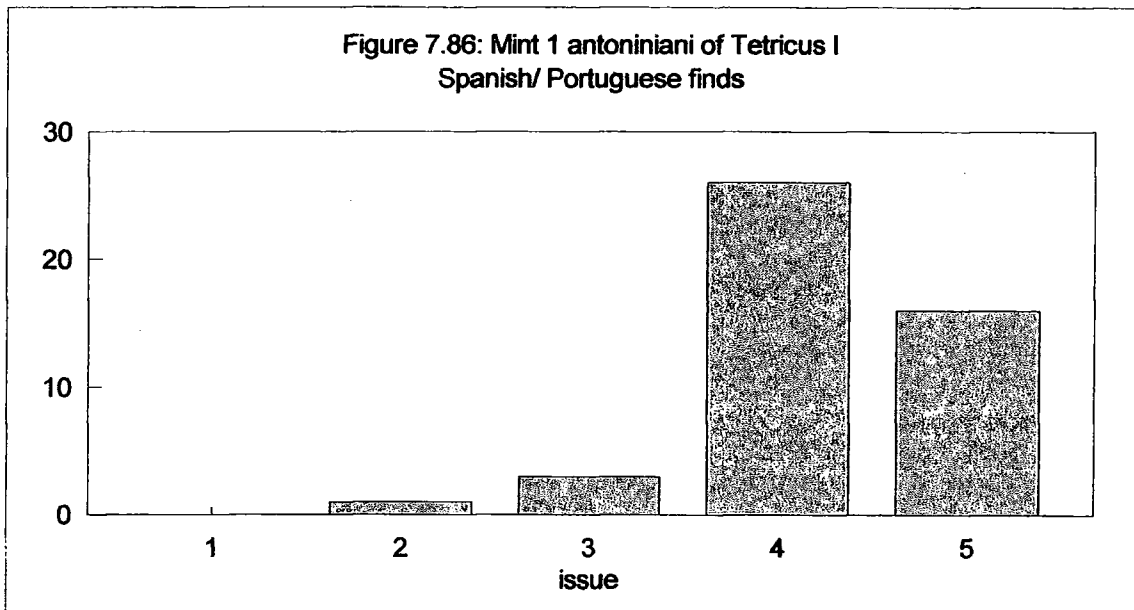


Figure 7.87: Mint 2 antoniniani of Tetricus I
Overall

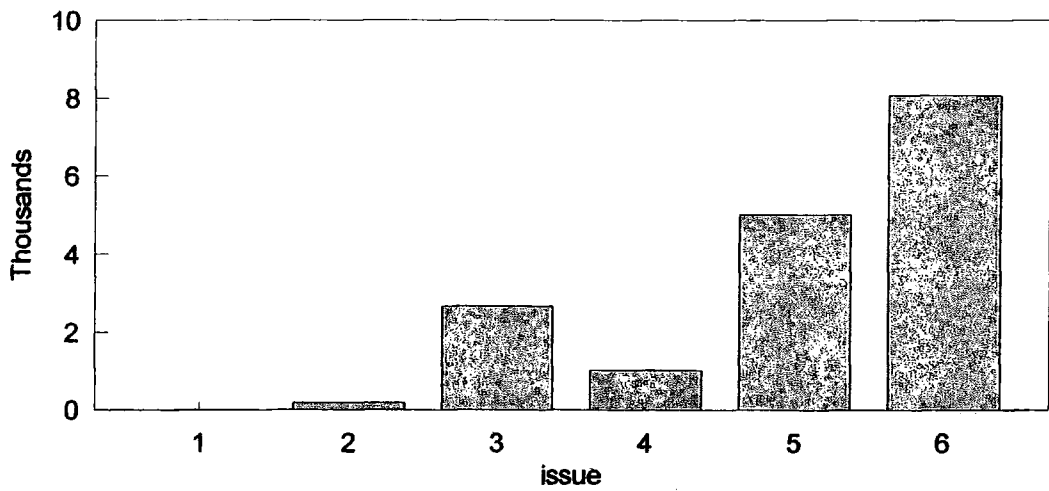


Figure 7.88: Mint 2 antoniniani of Tetricus I
UK finds

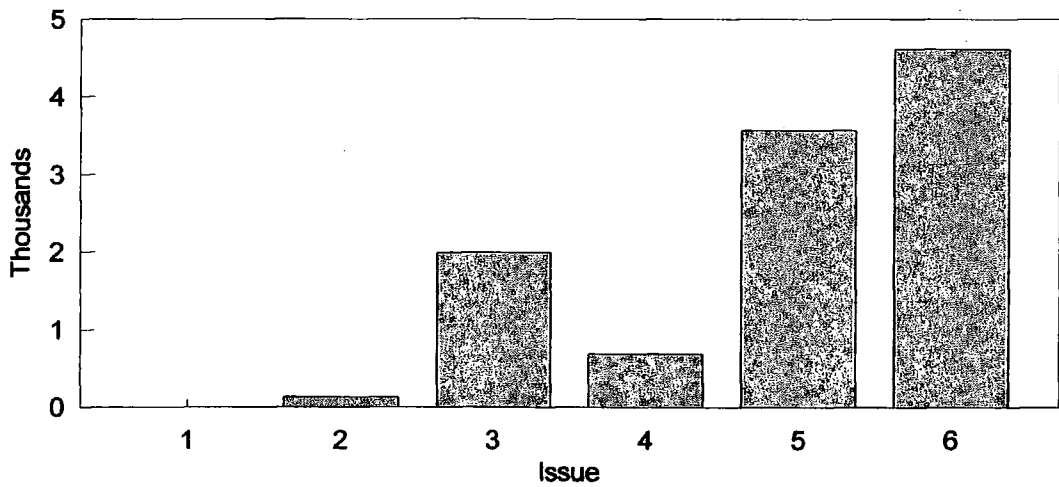


Figure 7.89: Mint 2 antoniniani of Tetricus I
French/ Belgian/ Netherlands finds

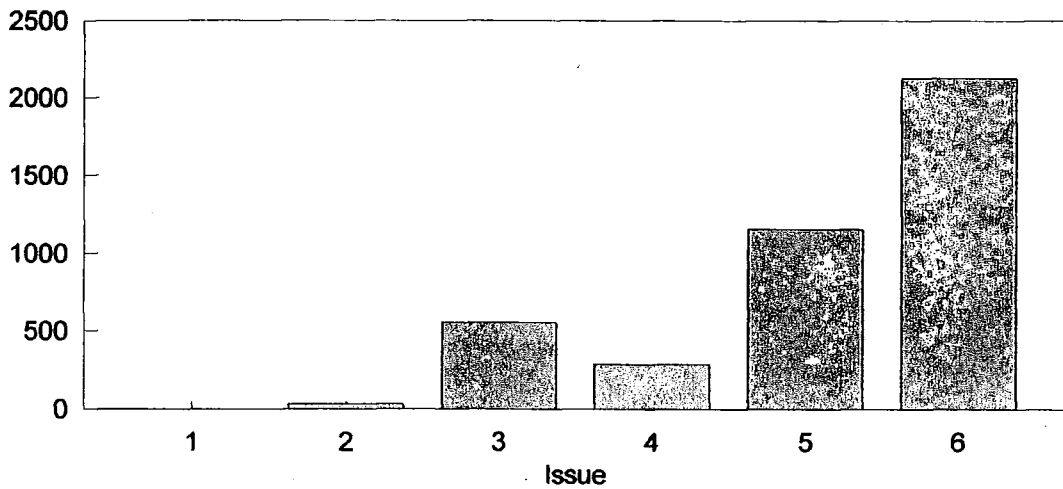


Figure 7.90: Mint 2 antoniniani of Tetricus I
German/ Luxembourg/ Austrian/ Swiss finds

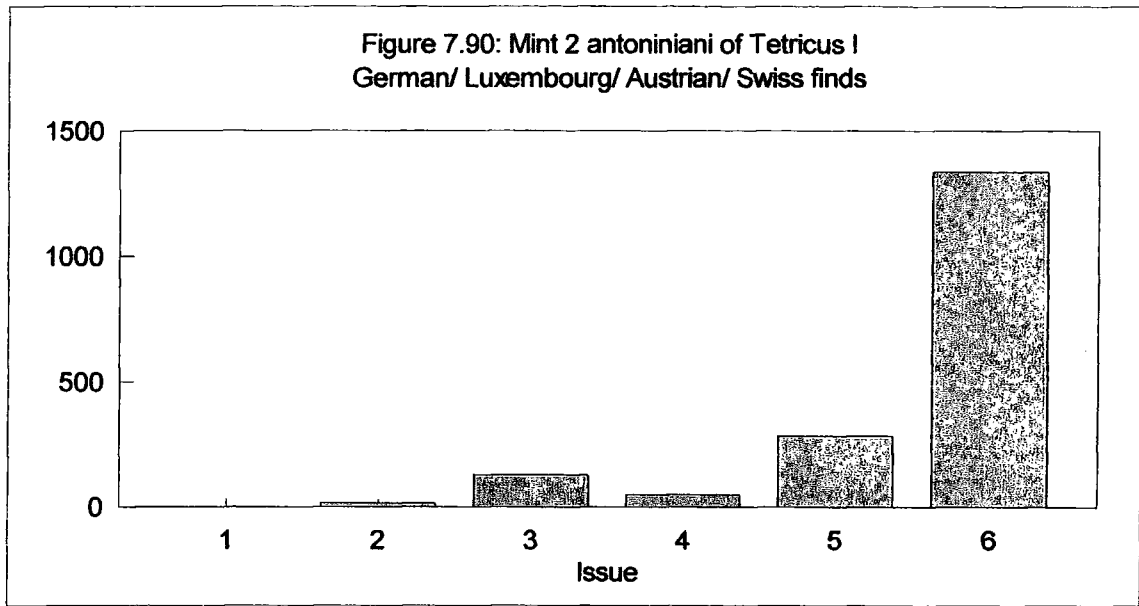


Figure 7.91: Mint 2 antoniniani of Tetricus I
Spanish/ Portuguese finds

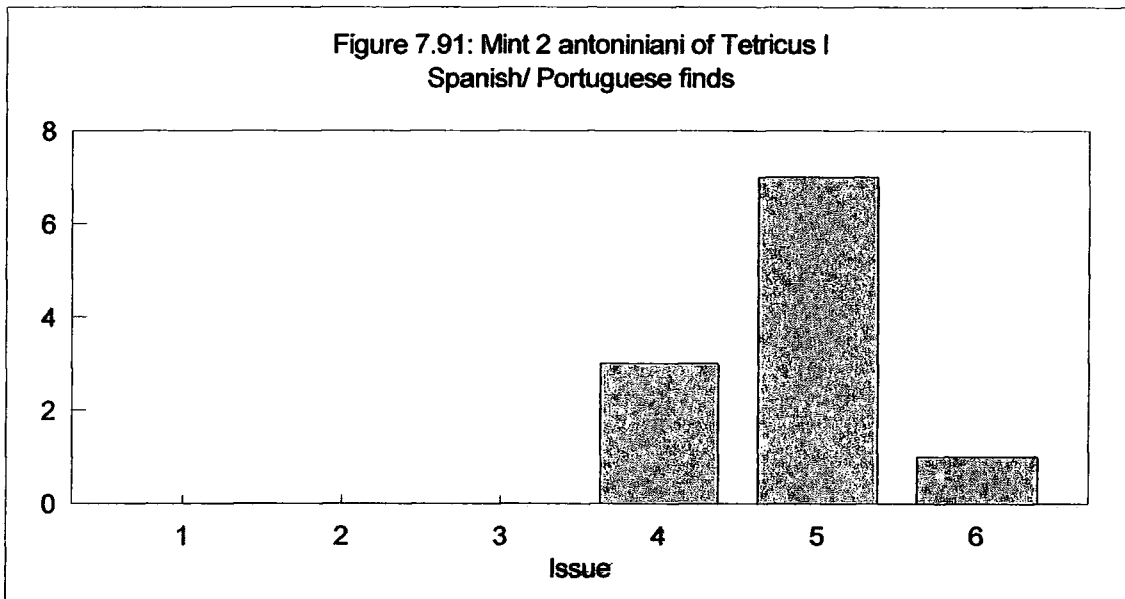


Figure 7.92: Mint 1 antoniniani of Tetricus I
UK hoards cusum

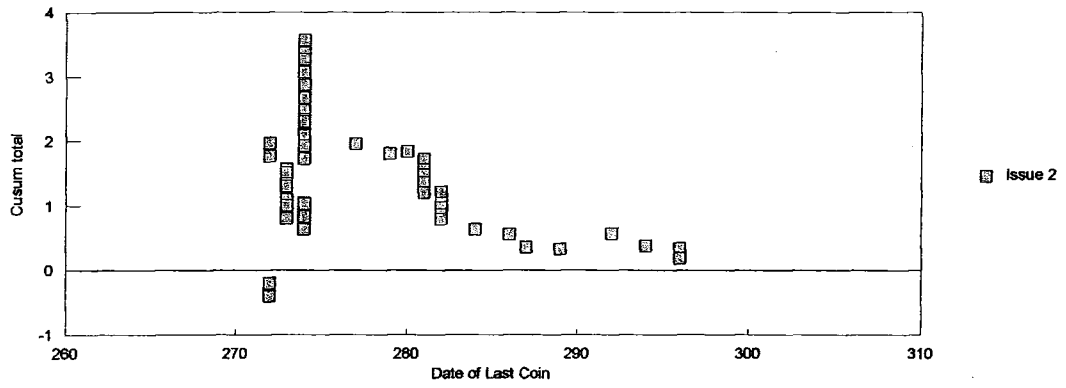


Figure 7.93: Mint 1 antoniniani of Tetricus I
UK hoards cusum

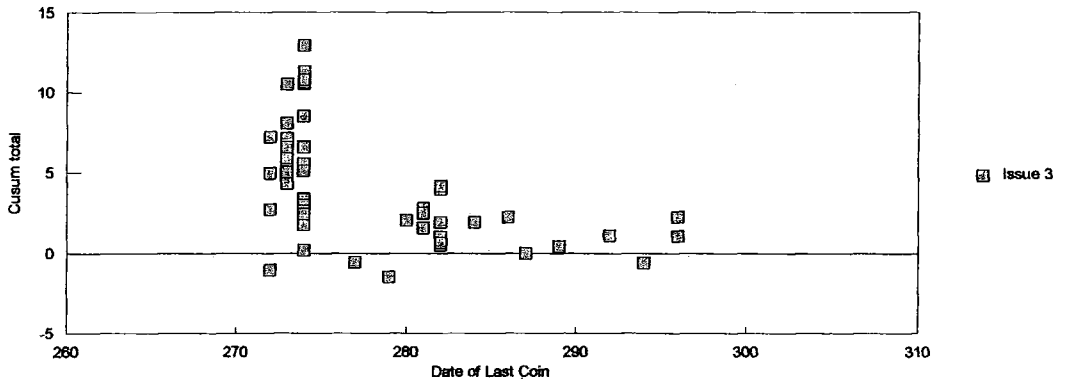


Figure 7.94: Mint 1 antoniniani of Tetricus I
UK hoards cusum

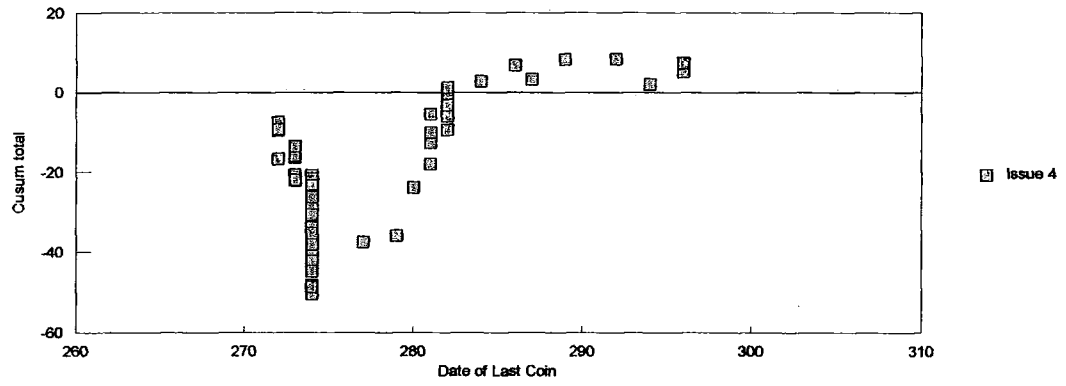
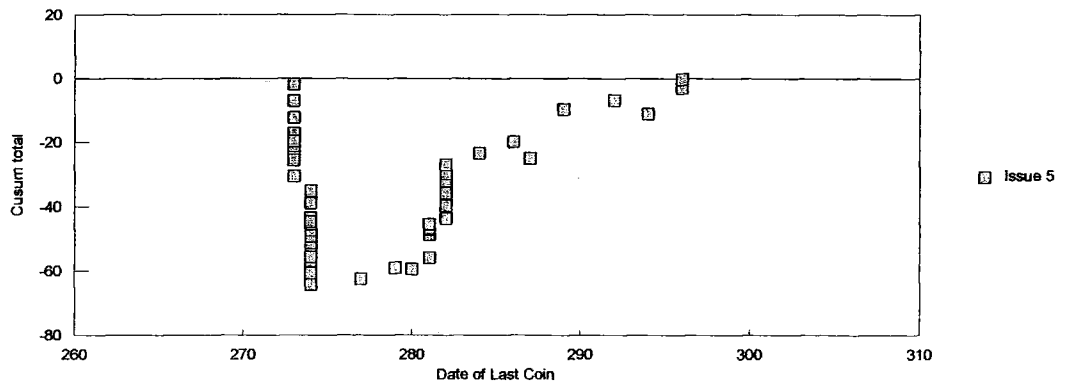
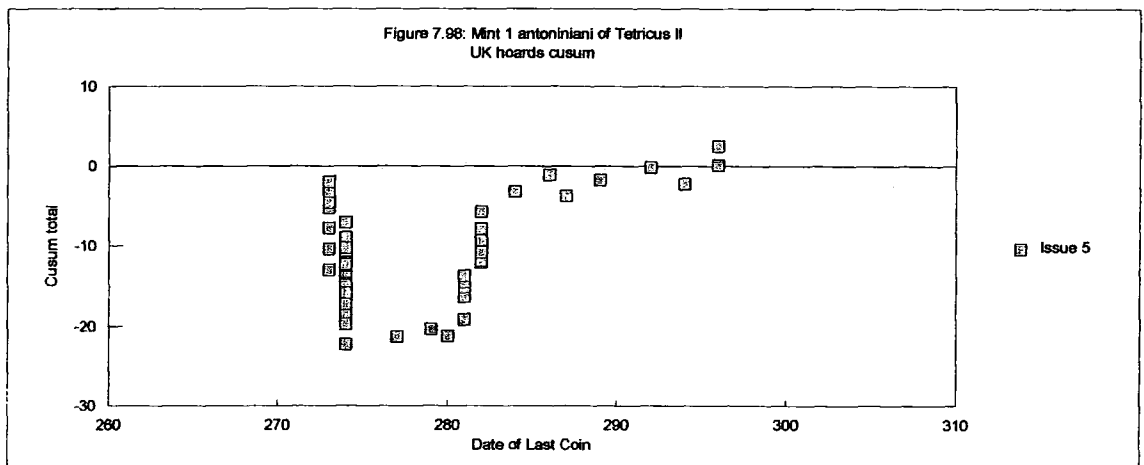
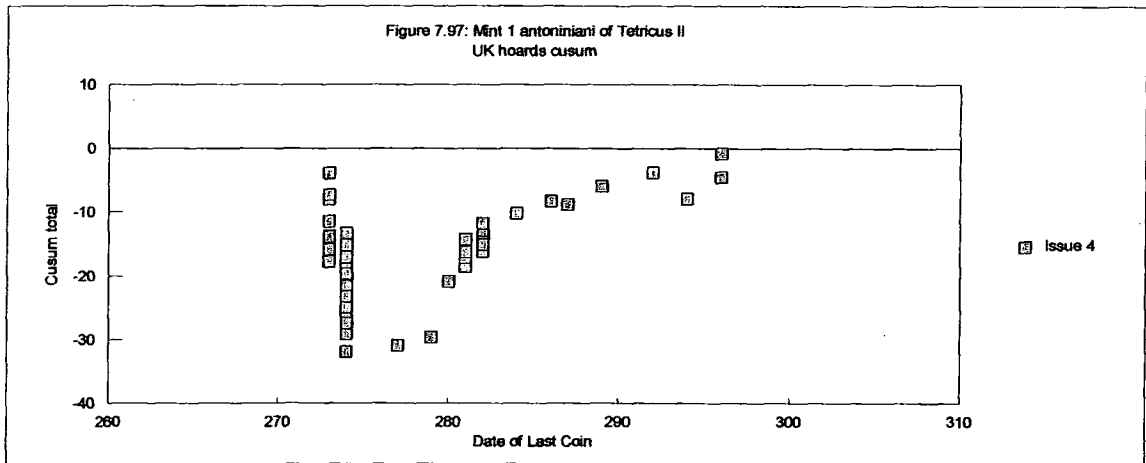
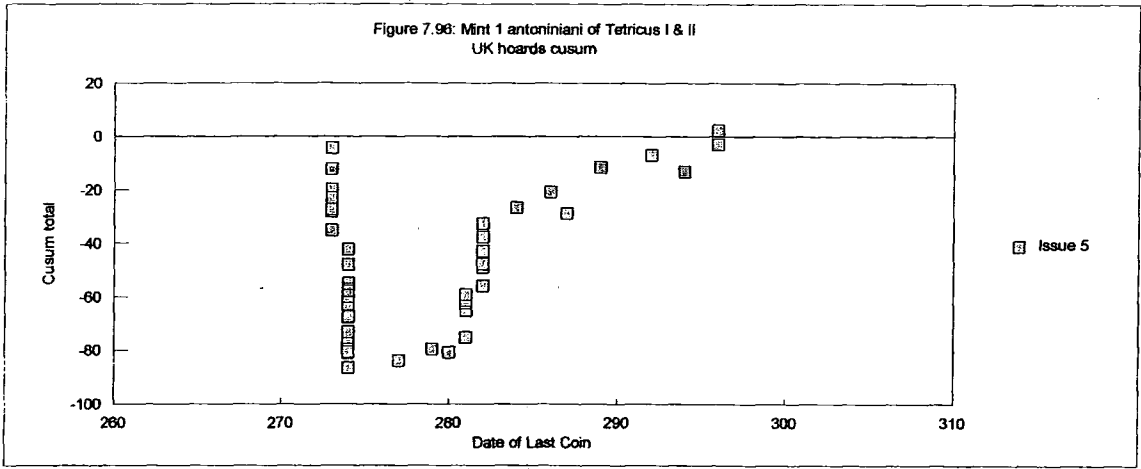


Figure 7.95: Mint 1 antoniniani of Tetricus I
UK hoards cusum





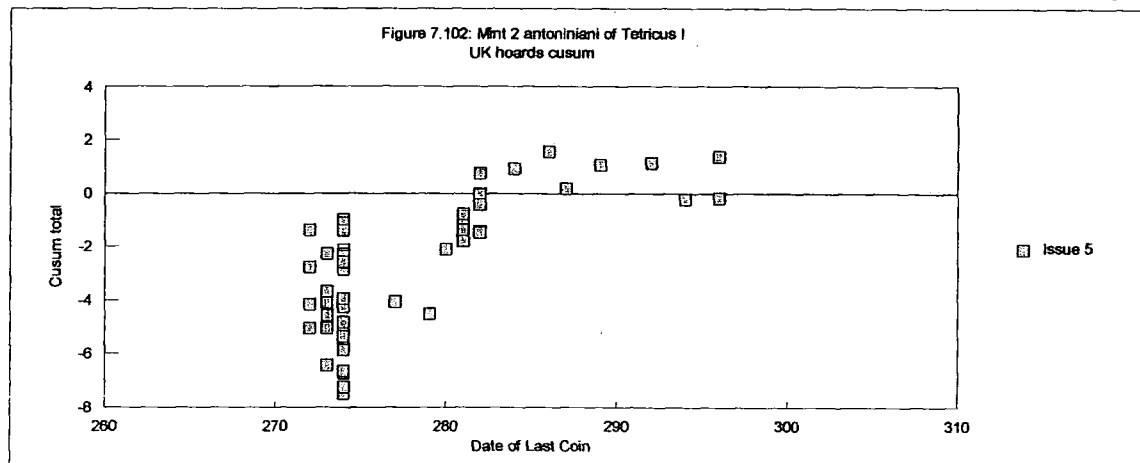
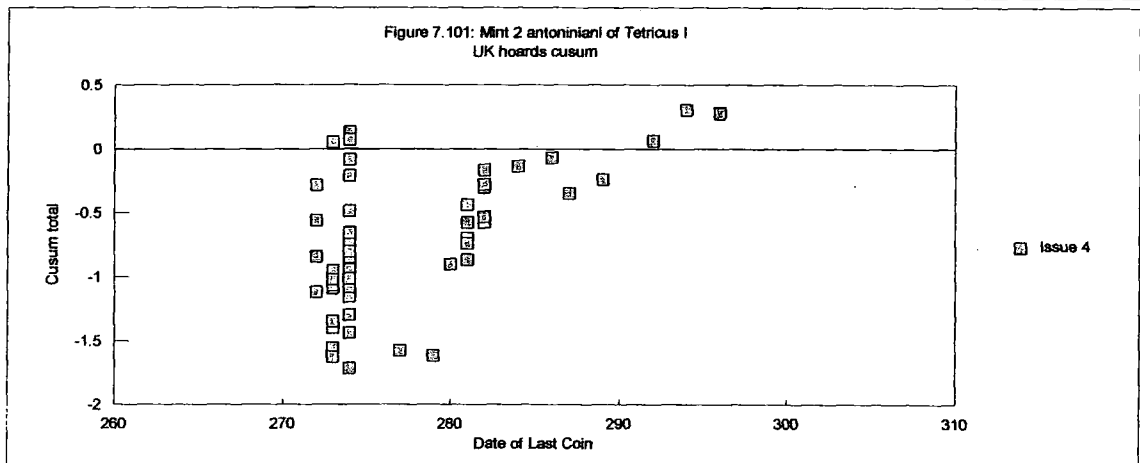
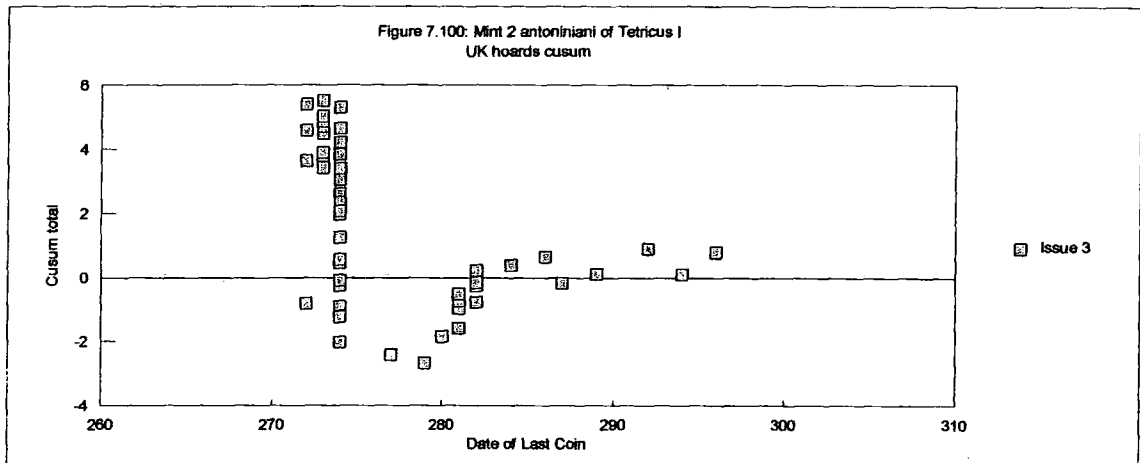
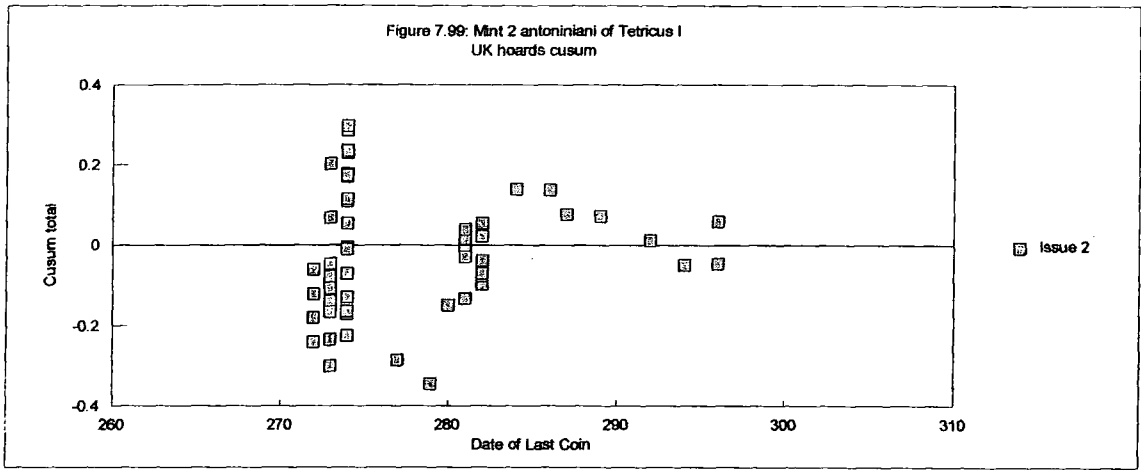


Figure 7.103: Mint 2 antoniniani of Tetricus I
UK hoards csum

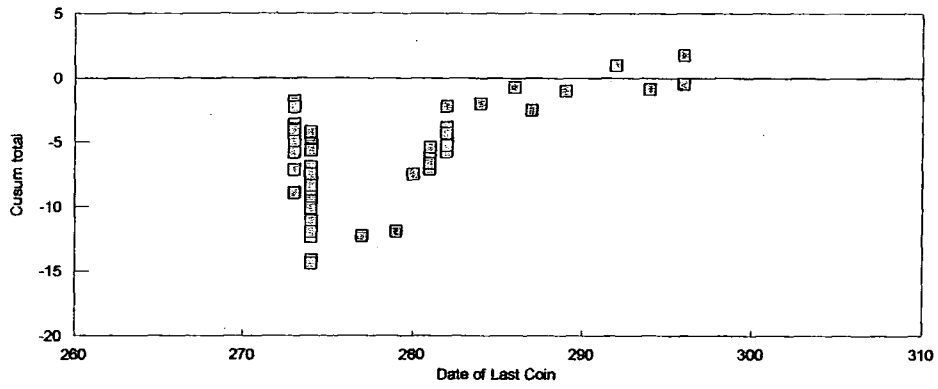


Figure 7.104: Mint 2 antoniniani of Tetricus I & II
UK hoards csum

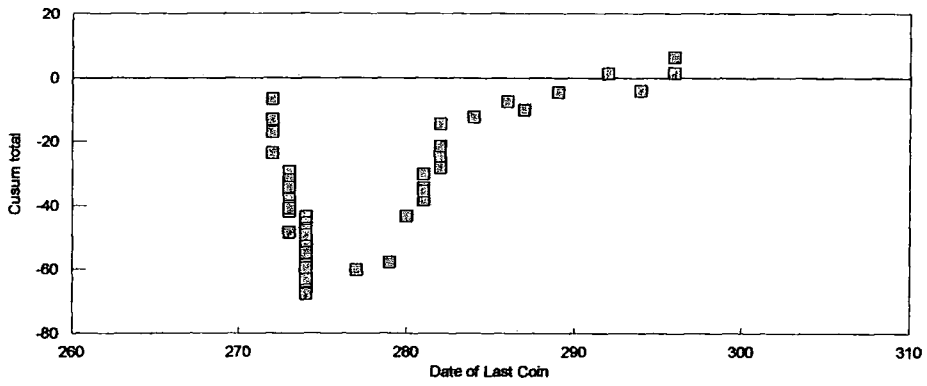
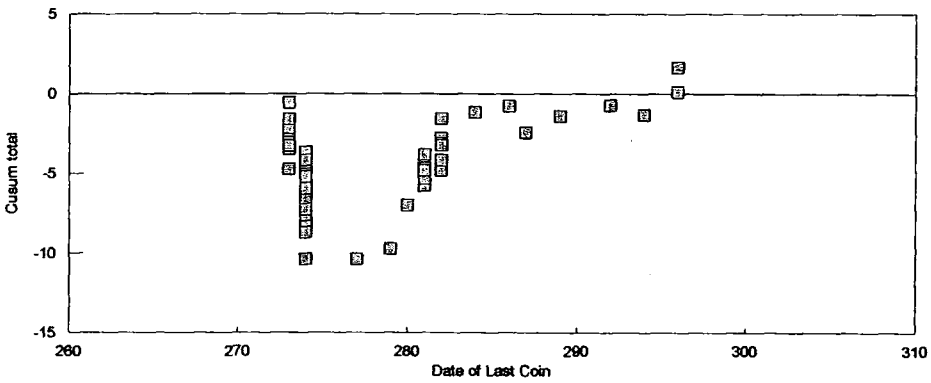
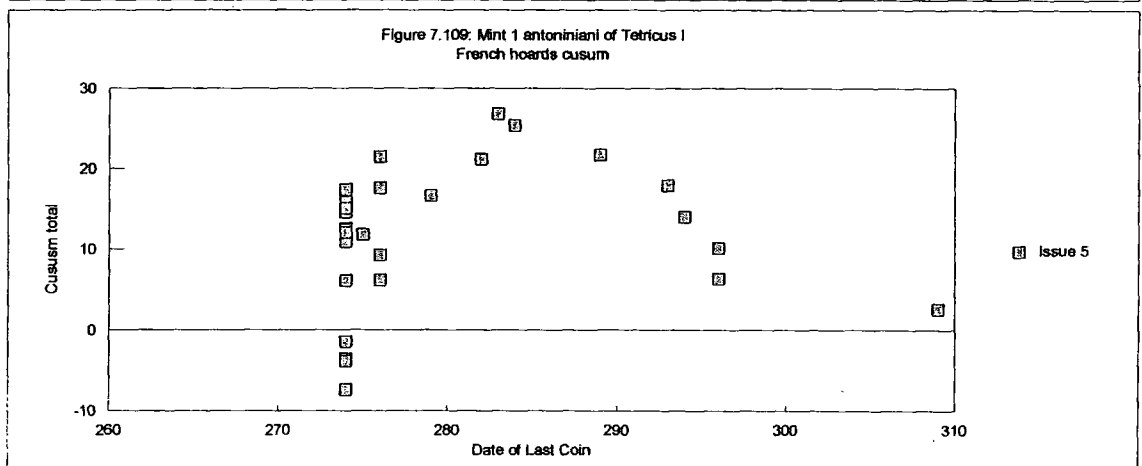
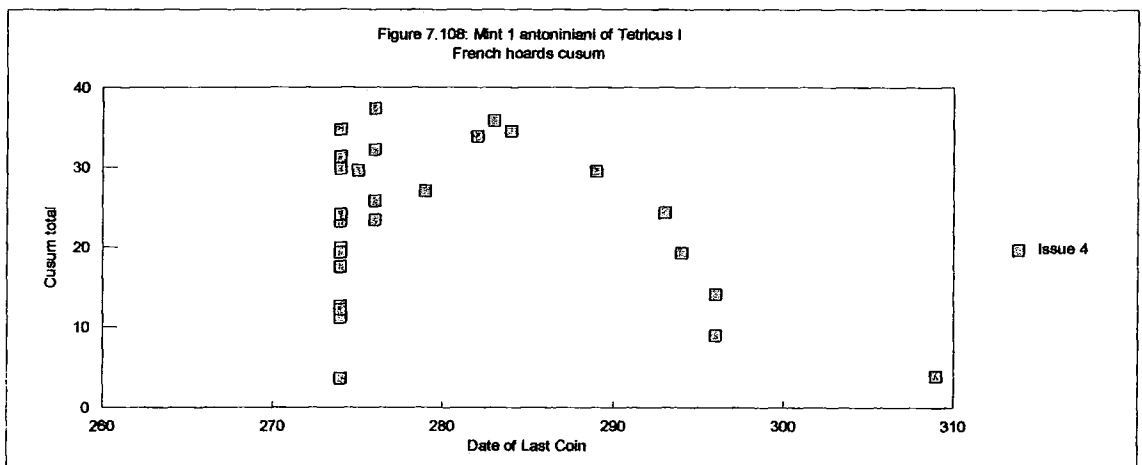
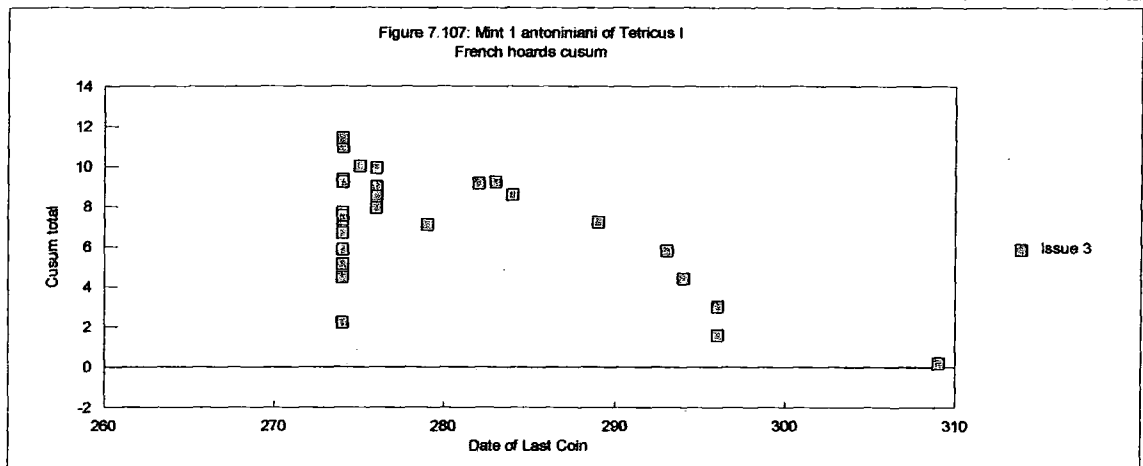
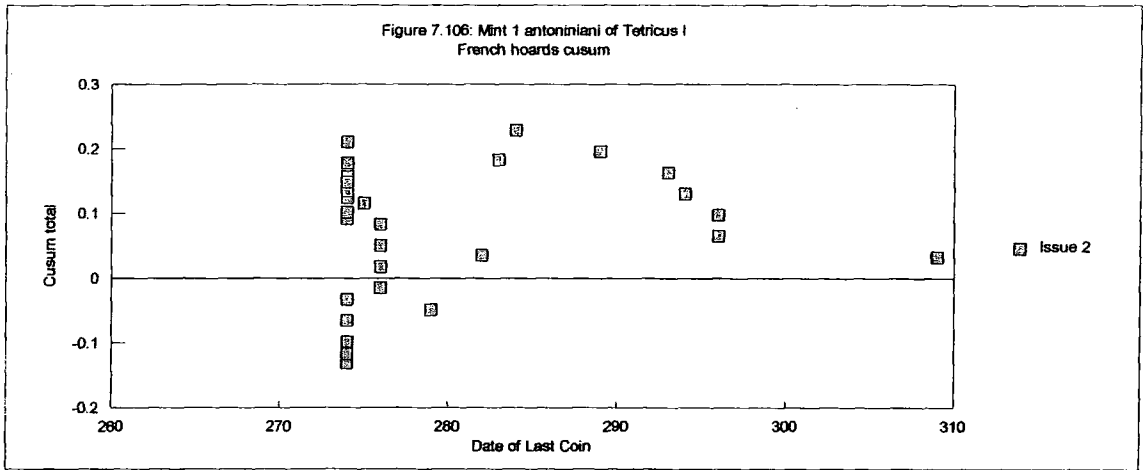
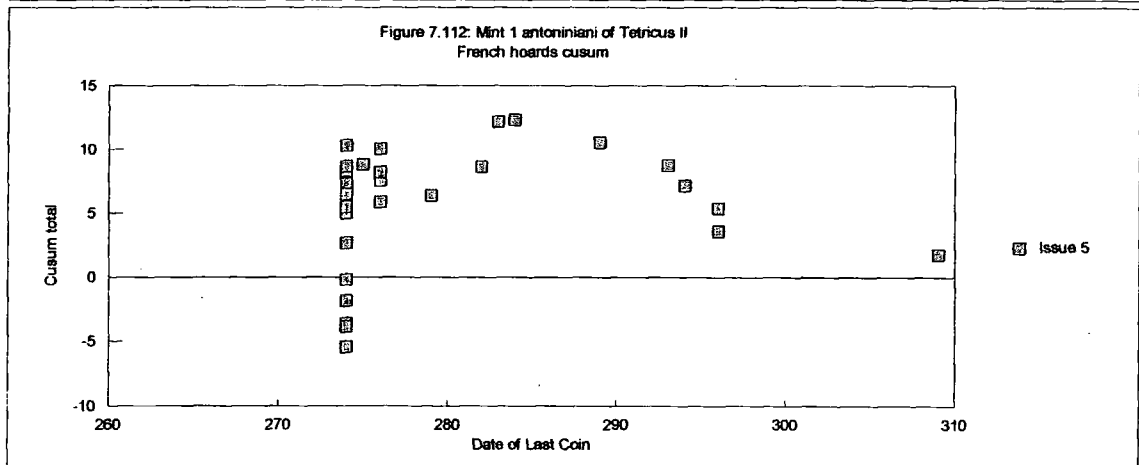
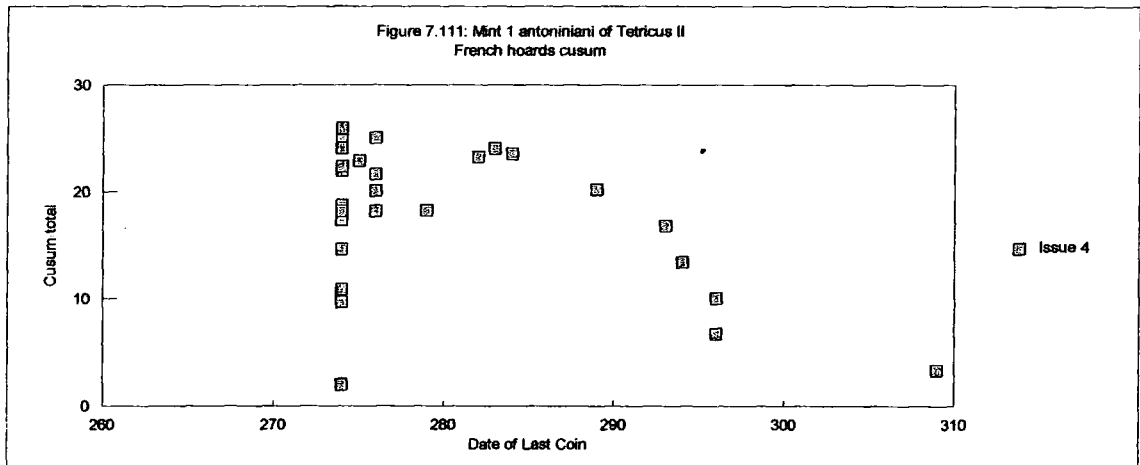
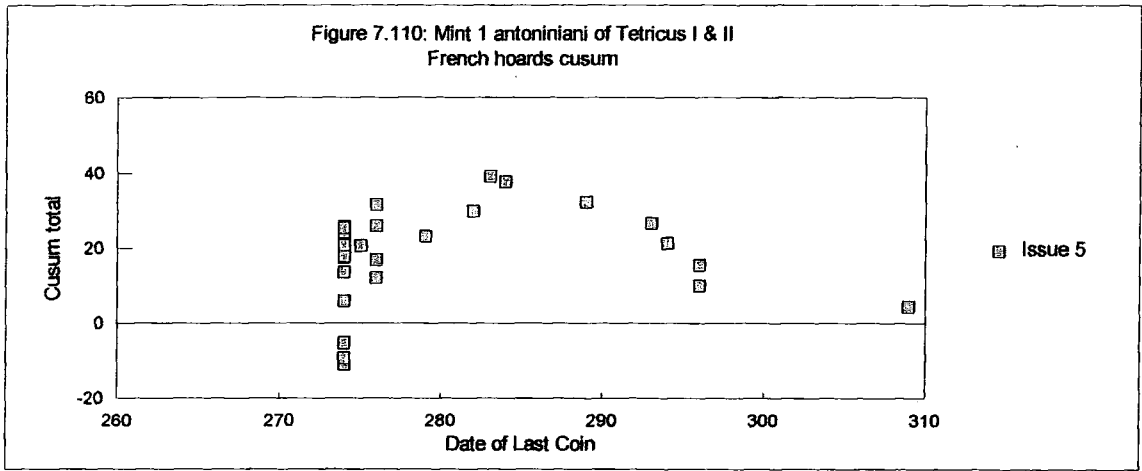
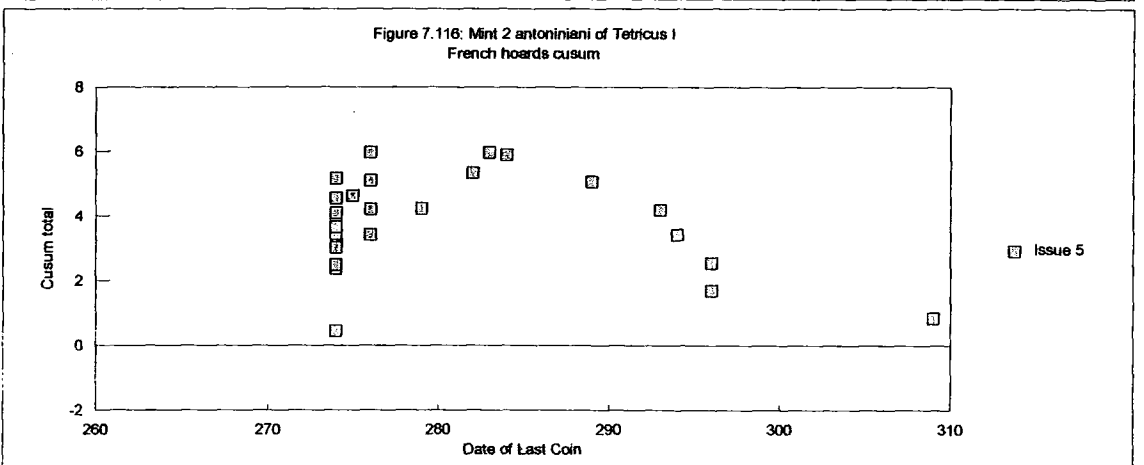
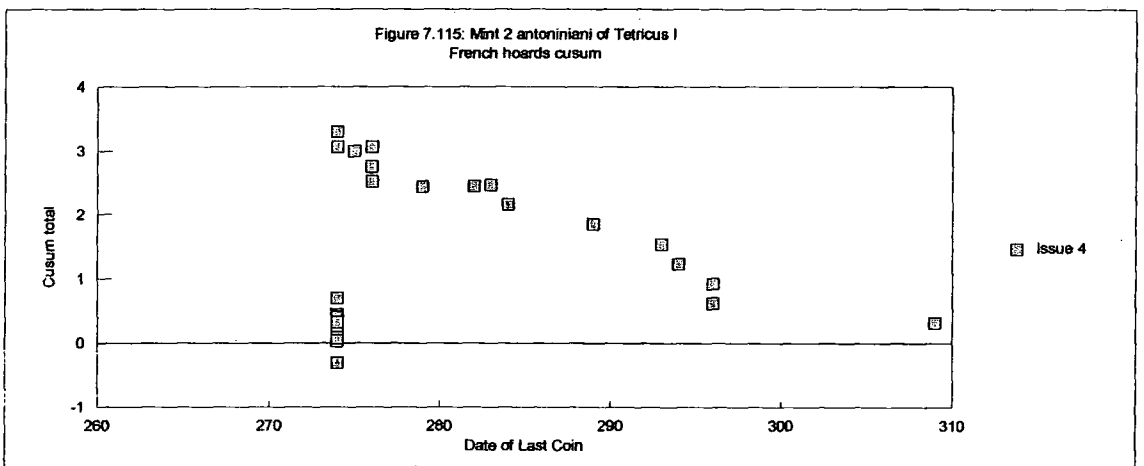
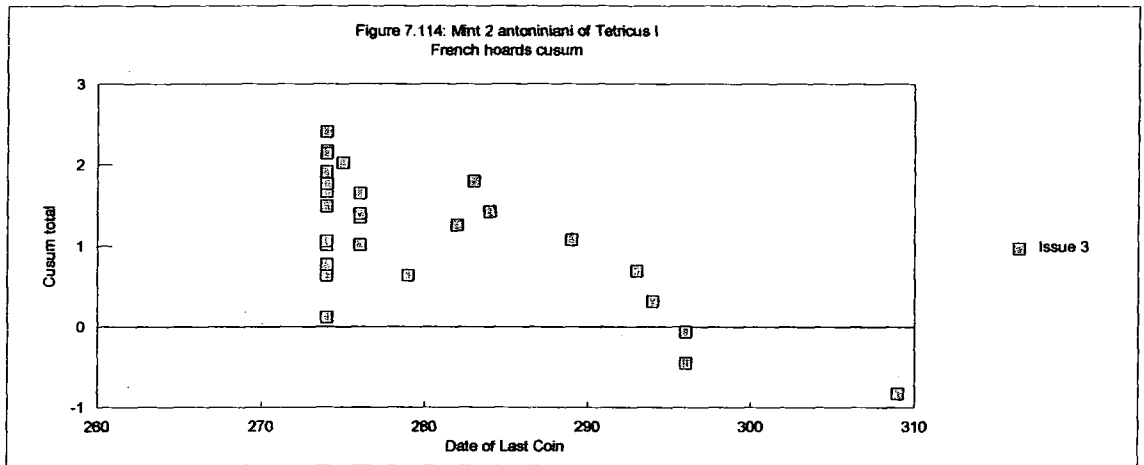
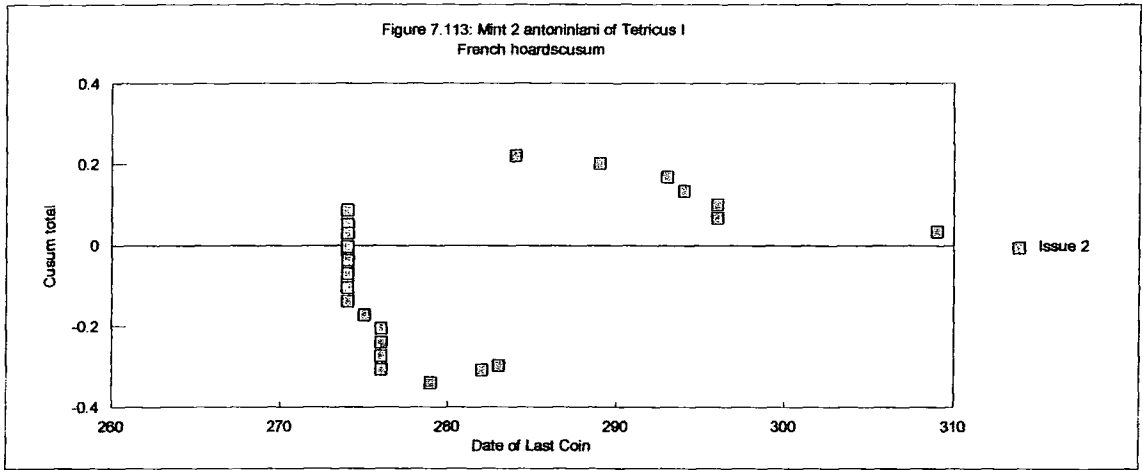


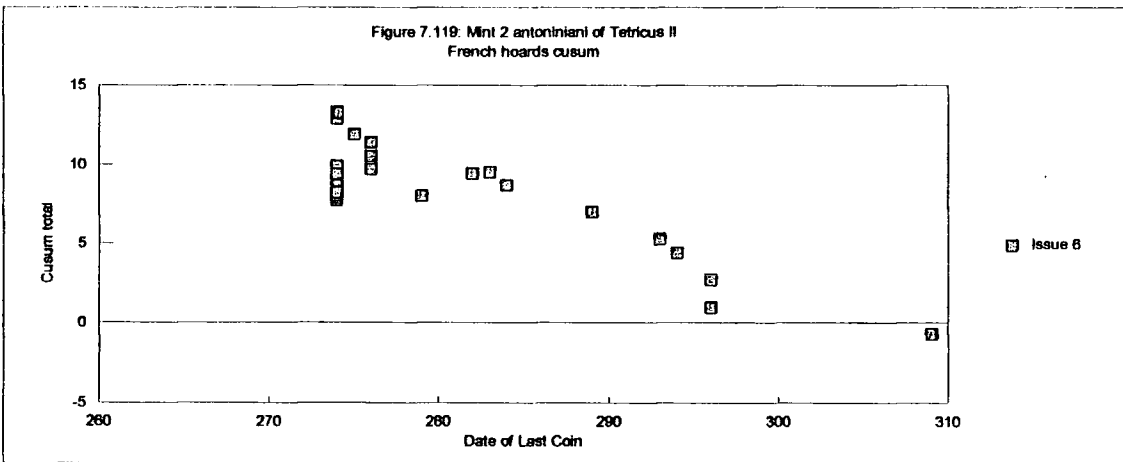
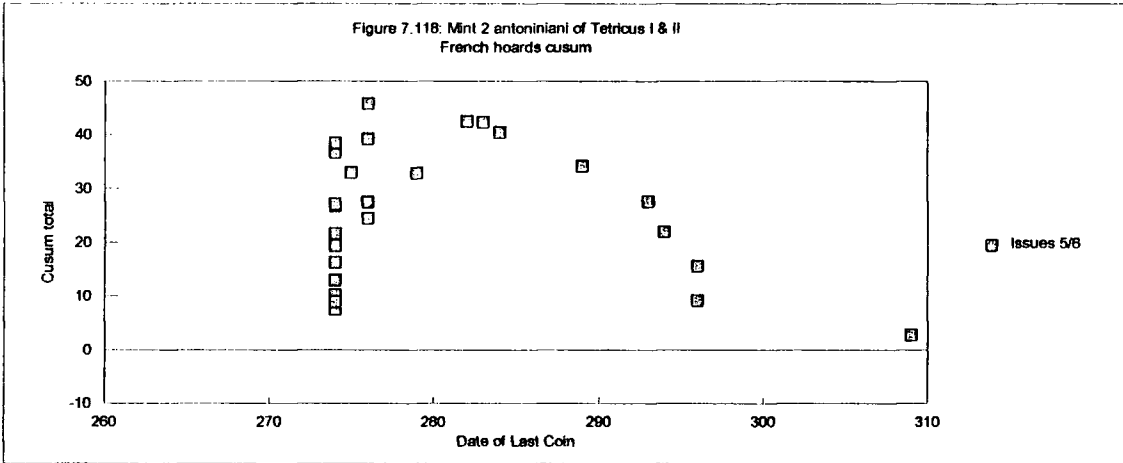
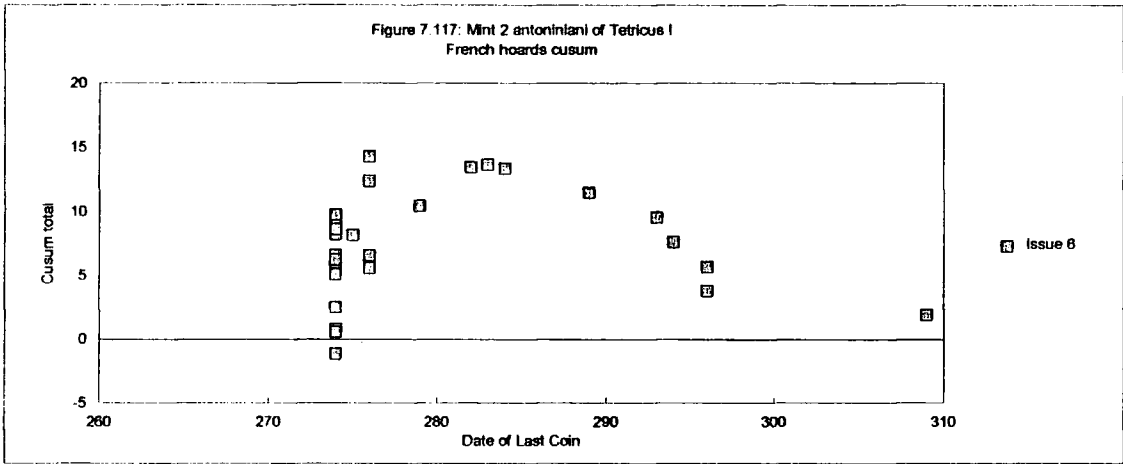
Figure 7.105: Mint 2 antoniniani of Tetricus II
UK hoards csum











CHAPTER 8 - THE GOLD COINAGE AND ASSOCIATED ISSUES

The gold coinage of this period is worthy of some comment and the context does require some knowledge of the monetary history of the earlier third century. Prior to this period it would seem from the chemical analyses that have been undertaken that the gold and silver coins were pegged. That is the relative values of the gold and silver coins were linked. However, some time during the first half of the third century it has been suggested that the links were apparently severed, leaving the gold coinage to circulate freely above its notional value, although there is some evidence to the contrary^{1,2}.

When any change took place is not entirely clear. It has been noted that under Severus Alexander (235-8AD) the mean weight and fineness of the gold coinage was unchanged from the reign of Elagabalus, however the variation in the weight had increased greatly resulting in an observed weight range of 7.25 grammes to 5.38 grammes³.

Further evidence for a change in the relationship between the gold and silver coinage during the earlier part of the third century is recorded in an inscription from 238 when a certain M. Aedinius Julianus boasts that his salary is paid in gold, unlike his colleagues⁴. The date of this inscription may also provide a clue to the reason why payment in gold was so advantageous for 238 was the year of the reintroduction of the silver radiate, notionally a two denarius piece but containing the silver at this period of approximately 1.38 denarii, even more over valued than its previous issues under Caracalla and Elagabalus⁵.

Others suggest that the abandonment of the fixed relationship of the gold coinage to the coinage in other metals was not until the reign of Aurelian (270-5AD), yet again this would seem unlikely given the reform of the silver coinage, increasing the silver content, the weight of the coin and revaluing the radiate as a four denarius piece instead of two^{6,7}. The period of the Gallic Empire falls between the two potential extremes.

Furthermore the striking of medallic gold "multiples", that is, multiple aurei, was becoming more frequent. The issue of gold multiples or medallions becomes more frequent through the third century and this mirrored a decline in cameos and other engraved gems. Whether this reflects a change in taste or a desire for imperial gifts with a monetary value is unclear but the two phenomena cannot be unconnected. In support of the ceremonial or decorative role played by the gold coinage, perhaps replacing the engraved gems, is the number of gold coins which have mounts or gold coins with evidence of having been mounted that are extant from the period.

There are two examples of Gallic Empire gold coins from Britain which support this idea. The first of these was discovered at Caerleon in the 19th century and is now lost to us. There a gold piece of aureus size bearing the conjoined busts of Hercules and Postumus was discovered, Schulte group 11a. Unfortunately the piece is a brockage, that is the obverse design is also present on the reverse but backwards and impressed rather than raised and doubts have been raised over its authenticity⁸. It could, however, be a decorative piece (an award) made from coin dies or an actual coin.

The second example is the recently discovered gold ring from Poringland, Norfolk with

an aureus of Postumus set in it, Schulte 37a, group 5. The ring was probably manufactured in the third century and although not of a quality to make it likely an imperial gift it was still a high status decorative item and unlikely to have been a proud possession after the fall of the Gallic regime^{9,10}.

Allied to this are the strikes in base metal, sometimes from gold dies. Notionally these non-radiate base metal coins have been regarded as issues of denarii. They are not frequently encountered, especially when one compares them to the radiate issues and it has been suggested that the bulk of the issues of denarii after the reign of Gordian III through to the relatively common issue of "denarii" (but in reality double denarii as they are from the period after the coinage reform creating the radiate four(?) denarius piece) from the Rome mint in the names of Aurelian and Severina may primarily serve a medallion or ceremonial function, rather than as routine currency¹¹. The low survival rate of these issues being used to suggest their short supply in the third century makes it unlikely that these laureate fractions were in widespread use as routine fractional radiates. The wear exhibited on some specimens, and the poor quality of die cutting and striking of some issues, however, does not preclude their use as currency.

The Gallic Empire gold issues, whilst frequently borrowing types from the artistic repertoire of the current mint output for their reverse type, are struck from dies of superior workmanship and often have bust types ornamented with shield, spear and/or helmet. An examination of the published weights of the specimens of "aurei" rather than the smaller "quinarii", primarily from RIC but also from a number of published

specimens in sale catalogues, displays a wide variance, somewhere in the order of $\pm 16\%$ for the issues of Postumus (figure 8.1).

Allied to the gold issues are a series of strikes in bronze from gold dies, so called "abschlage". The term abschlage literally means down payment or deposit but in this context is taken to mean proof or test strike which is what some interpret these bronze strike from gold dies to be. However, the fact that they circulated and their frequency of occurrence probably refutes this idea. I believe that there is a long way to go before we can accept a hypothesis that places the gold issues of a particular type as a "first class" reward and the bronze abschlage as a "second class" or subsidiary reward.

That the gold coinage had not lost all touch with the base metal radiate currency may be witnessed when the weight of the gold coins is examined. Although there is a wide variation in the individual weight of the coins minted in any one particular year, there is a marked reduction in the observed weight of the aurei after the first issue of gold by Victorinus, as demonstrated by using the cusum technique described in chapter 7. By plotting the successive summed variation from the overall mean of the weight of aurei a marked down turn occurs in 270. This trend, whilst visible in a time series plot becomes irrefutable using cusum (figures 8.1-2). The reduction in weight is in the order of 33%, however, as noted in the previous chapter the reduction in the weight of silver in the radiate coinage around 268 was approximately 75%. There was a further reduction to a silver content of 6% of the pre 268 debasement amount during the reign of Tetricus.

Figure 8.1: The weight of Gallic Empire aurei

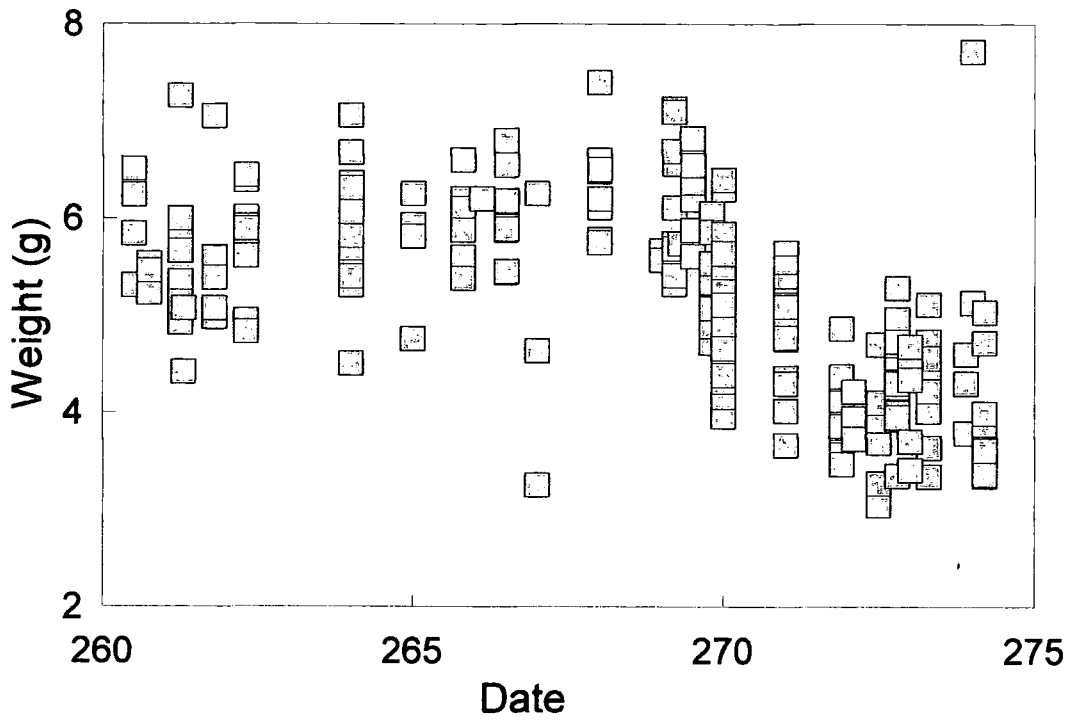
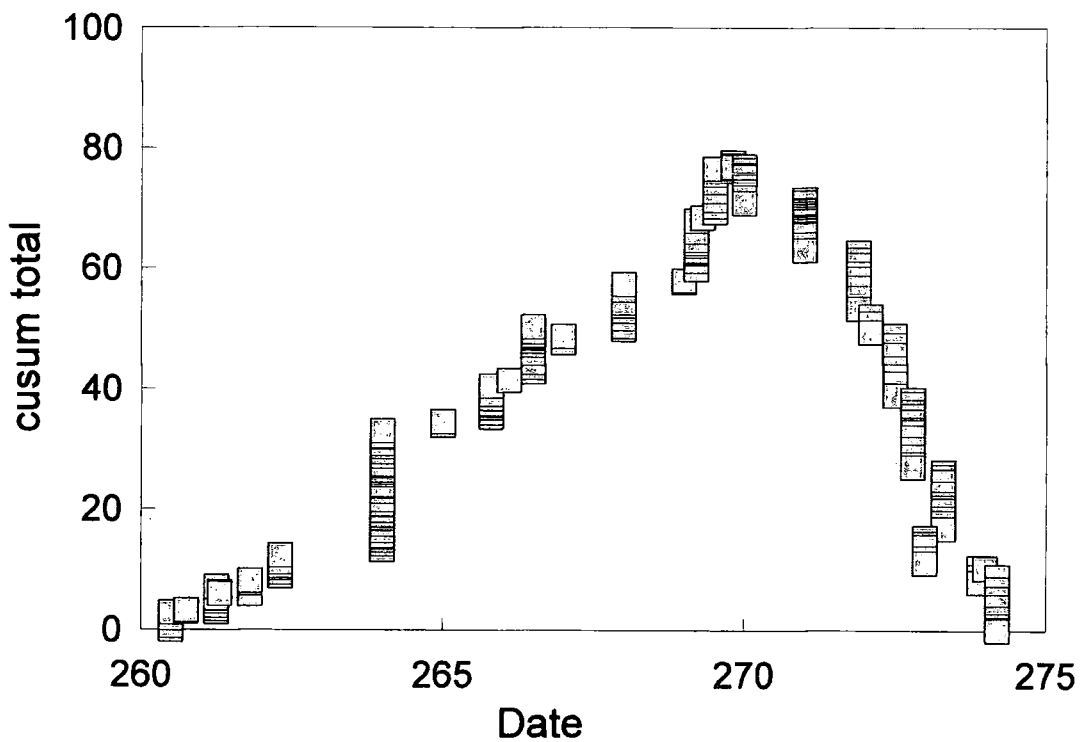


Figure 8.2: The weight of Gallic Empire aurei
Cusum plot



The relative drop in gold content is nowhere near as great after 270 and does not coincide directly with the change in the alloy of the base silver coinage. Furthermore there is no comparable drop in the weight of the gold coinage under the reign of Tetricus.

It is possible speculate as to the reason for the 270 reduction in weight in both the gold and silver content of the coins. The most obvious is the final loss of Spanish territories to the Gallic rulers. Spain had been a significant mineral source to the Roman Empire, including gold and silver, and although after the second century production was very much reduced it did continue into the fourth century¹². The inscriptional evidence reviewed earlier does not reveal any Gallic inscriptions after late on in the reign of Postumus, whereas the Central Emperors are represented from Gallienus onwards. The loss of the only significant precious metal supplies within the Gallic Empire would alter the metal available to coin. This would also explain why there is no similar drop in gold weight under the reign of Tetricus.

An alternative hypothesis is that given the loss of the gold supply from Spain Victorinus overstretched himself with respect to the amount of gold coinage issued for his accession donativa to try and ensure his continued support after two usurpations.

Schulte notes a number of minor variations in weight between successive issues of Gallic gold, other than during the reign of Victorinus¹³. The cusum analysis has not identified these as being statistically significant and, given the relatively small sample sizes used in

order to determine the mean weight of the issues, these probably reflect chance variation rather than deliberate alteration.

Some work has been done to plot the occurrence of Gallic and Central Empire gold coins in hoards and site finds, along with finds of laureates or denarii, and it is worth examining the distribution of such coins from these works^{14,15}.

The first observation is that the number of Gallic Empire gold coins encountered are, approximately at least, in proportion to the length of the reign of the ruler.

Table 8.1 Comparative numbers of the known gold coins of the Gallic emperors

Gallic Emperor	No. (Hiernard 1976)	No. (Hiernard 1983)	No. (Schulte 1983)
Postumus	42	62	149
Laelian	3	3	12
Marius	1	3	7
Victorinus	9	14	46
The Tetrici	17	29	74

The coins are recorded by Hiernard are from provenanced finds, rather than collections. Thus whilst this need not necessarily reflect the relative numbers produced it may give us some comfort that the sample we are dealing with is not biased towards preference for scarcer types that would potentially "infect" an unprovenanced museum collection. I have argued for the use of museum collections when dealing with the common base metal radiate issues in the previous chapter as whilst there are some scarce types

provincial museum holdings can be built up adequately from local finds. With the gold coinage the situation has changed, there is a limited supply available and thus there has been the temptation to import coins from sales or collections to increase holdings.

The distribution of the finds of Gallic Empire gold coins are concentrated in two areas. These are within the Gallic Empire territories and the free lands outside the Roman Empire.

The occurrence of Gallic gold coins from the free lands to the east of the Rhine is marked contrast to the Central Empire territories. It is recorded that during the latter part of the reign of Postumus that "huge forces of Germans" were allies in the war against Gallienus¹⁶. Some of the coins found there may well have been from stipenda, donativa or other payments made to tribal leaders¹⁷.

However, the problem with many of the Gallic gold coins from "free Europe" is that they are found as part of grave goods or isolated finds. This removes the opportunity to determine when the coins were deposited and also establishing a terminal date for their movement outside the Roman Empire. There is some evidence that the gold coins of the Gallic Empire were items that had a long life, for example the find of an aureus of Postumus (Elmer 362, Schulte 80-88) in a hoard from Brangstrup in Denmark which contained Byzantine solidi of Constans II¹⁸. That gold coins of Postumus through to Tetricus are recorded from these areas, along with concurrent and later Central Empire gold coins perhaps eliminates any single explanation.

By contrast very few Gallic Empire gold coins have been recorded from territories within the Central Emperor's control, indeed the only one I can record with certainty is an aureus of Tetricus I (Elmer 807, Schulte 36) found at Besenzone (Piacenza) in north west Italy in 1913. The coin was not a solo find but from the available information I am unable to ascertain the other coins in the deposit, nor the date of deposition. Schulte dates the type to the autumn or winter of 272.

Similarly only a single Gallic Empire gold coin is recorded from Spain, an aureus from Postumus (Elmer 377, Schulte 105) dated by Schulte to December 265. This was an isolated find in the Navarre region of north east Spain in 1916 and therefore cannot be securely dated. A single gold coin of Claudius II is also known from Spain from the Jaen region.

Finds of Central Empire gold coins within the Gallic territories are more numerous than Gallic in Central territories although one must then consider the date of deposition very carefully before one can make statements about circulation. To this extent we are fortunate that of all the finds of Central Empire gold recorded by Hiernard are either isolated coins or are within hoards datable to before or after the Gallic Empire. Thus there is little or no evidence to suggest that the gold coinage of the two regimes intermixed during the period of the Gallic Empire. The only evidence of the coins circulating side by side is in hoards terminating post 274, or if not circulating then at least no bar against hoarding them together, within the former Gallic territories.

One should again turn back to Reece's model of coin circulation and observe that it is

particularly the gold coinage which is returned to the exchequer in the form of tax revenue. If any Gallic gold were to get returned to the Central Empire treasury there is the opportunity to melt down and restrike the coins with a more appropriate design, a design not bearing the image of a usurper. Thus there was only a limited opportunity for Gallic coins to circulate outside the Gallic Empire, and, similarly, for Central Empire gold coins to circulate within the Gallic Empire.

This is in marked contrast to the base metal radiate coins which do appear to co-exist after 268/70 when the silver alloy was brought into line between the two states. This differential between the gold and base silver coin circulation can be probably explained by going back to the use of gold coins and the general model of coin circulation proposed by Reece¹⁹. In that model it is the gold coins which are used to move wealth across the Roman Empire to fund state payments and receipts, gold coins being able to transfer large amounts of wealth in relatively small volumes. Given the gap between the purchasing power of an individual base silver radiate of the period and an individual gold coin it makes sense to move money as bullion. Transactions at a local scale are enacted through a series of money changers. It was also through these same money changers that base metal coins were returned into gold as a cumulative tax payment for an area, gold being the only suitable metal for such payments, again ensuring small volumes for transportation and control over the metal being returned to the state, rather than the variable precious metal content of the notionally silver coins.

Thus there is the mechanism for the gold coinage never moving far from the place it was sent to from the treasury unless it was to be returned through the fiscal system and thus

why the Gallic Empire gold coinage and the Central Empire coinage were kept apart, at least until the fall of the Gallic Empire.

After the fall of the Gallic regime one may imagine that any gold coins of the usurpers returned to the imperial treasury were quickly recoined to show a suitable emperor. Those that did not return could find themselves incorporated into later provincial hoards.

This also explains the predominance of Gallic Empire gold coin finds in areas of military activity. Thus Hiernard identifies only two gold coins of Postumus from Britain, whereas there is a concentration of Gallic gold from the vicinity of the Rhine, the seat of the Gallic emperors, along with a lesser concentration in the Rhone valley, the probable route of the reconquest.

By way of testing this hypothesis I wish to turn to the laureate base metal coinage of both the Gallic and Central Emperors. As noted earlier these coins are rather scarce and it has been hypothesised that they cannot initially have been intended to serve a strictly monetary function, although, undoubtedly, they did. It is also worth differentiating between the Gallic Empire "laureates" and those of the Central Empire.

The Central Empire appears to have made a substantial issue of laureate bronze/base silver around the time of the fifth sole reign issue of radiates from Rome during the rule of Gallienus, that is, the issue of radiates which is after a significant debasement and sees the Rome mint operating in twelve officinae rather than six. The corpus of laureate reverse types listed by RIC borrows heavily from the reverse types of the radiates. Thus

there is a definitive time for their issue and a link to the base silver radiate coinage. The date of this issue was put at between the second half of 265 and the middle of 267 by Göbl²⁰.

The date range proposed by Göbl is quite broad but it does encompass a number of other unusual coin issues during the reign of Gallienus. The time range coincides with the proposed issue date of anonymous sestertii bearing on the obverse the legend GENIVS PR and a portrait of Genius with the unmistakable facial features of Gallienus. The reverse has INT VRB within a wreath. It has been proposed that this issue commemorates the return of Gallienus to Rome after a military victory, possible at the battle of Naissus against an invading army of Herulians and Goths^{21,22}.

An issue that must be connected with the GENIVS PR coins and the issue of denarii or laureates is a unique coin recently discovered in the UK²³. The apparently base silver coin of Gallienus has on the obverse the portrait of Gallienus grafted on to a janiform bust with the legend "...IENVS GER.." remaining. The reverse has a quadriga galloping right with the word ROMA incuse in an entablature below. The type would appear to confirm a victory over the Germanic peoples and a return to Rome.

A further event worth celebrating within this period is the beginning of the 15th anniversary year of the reign of Gallienus. One may look to the coinage of Aurelian for parallels at the Rome mint produced an issue of large bronze associating Aurelian with his patron Sol and the issue of denarii of Aurelian and Severina at the beginning of his fifth year as emperor, just about the only issue of these denominations during his reign.

With the Gallic Empire laureate bronze/base silver issues the emphasis is not on the radiate base silver issues but rather the gold coinage, indeed, sharing die links (for example under Postumus Schulte links the reverse dies of 138a (AV), 139a (AE) and 140a (AE)). This, I believe, sets them apart from the laureate issues of Gallienus and Aurelian to a certain degree.

The pattern of finds identified by Hiernard would appear to support the hypothesis that the Central Empire laureates were readily accepted into the base metal circulating media as finds occur within Gallic territories which have terminal coin dates coincident with the period of Gallic rule. Hoards from Gibraltar, Sens and Colombier are all hoards which have terminal coin dates during the Gallic Empire, the latter two hoards being in central and northern France where Gallic rule is not disputed^{24, 25}. The Gibraltar hoard may be somewhat misleading due to the end of Gallic rule in the late 260's, although if the circulation of radiates within the Gallic Empire is unimpeded by official sanctions then this too supports the concurrent circulation of laureate base silver coins of Gallienus. Whether concurrent with the Gallic Empire or after the fall of Tetricus the laureate coins of Gallienus are not found in hoards containing gold coins.

The laureate coins of the Gallic rulers, like those of the Central rulers, are not found in association with the gold coins. However, they are also only seldom found within hoards. The list provided by Hiernard demonstrates that there is a concentration of these coins found around the cities of Cologne and Trier, the proposed mint cities of the Gallic Empire and also the area where the governmental structures were in place²⁶. A number of the coins are from grave finds. All this suggests to me that the Gallic laureates were

donative in nature and perhaps had less of a coinage function and more of a medallic function than the equivalent laureates of Gallienus.

NOTES

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3. Bland op.cit. pp. 69
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6. Casey, P.J pers com; An unpublished fragment of what appears to be supplementary material to Diocletian's Price Edict from Aphrodisias in Caria notes the "BICHARACTAM PECVNIAM QV.....VM POTENTIAM QVAE IN MAIORE ORBIS PARTEC.....QVATTVOR DENARIORVM", - *the bicharacta (2 character) coin, which the rest of the world knows as a four denarius*. This would seem to be referring to the eastern radiate coinage which, from the time of Gallienus but particularly after the reform of Aurelian, frequently had two standing figures on the reverse. For other fragments of this inscription see Erim, K.T, Reynolds, J and Crawford, M; 'Diocletian's currency reform; A new inscription' Journal of Roman Studies 61 (1971) pp. 171-7
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CHAPTER 9 - THE BRONZE COINAGE

Before going on to describe the character of the circulation of these coins it is worth defining what issues are to be regarded as the bronze coinage, especially as it is a period of very debased silver issues which look, to all intents and purposes, like bronze coins.

The bronze coinage discussed here is that which derived from the base metal sestertius, along with its multiple and its fractions, the coins traditionally marked with the letters SC, that is, coinage struck under the auspices of the Senate. However, examination of the relationship between the number of reverse types for each recognised issue would seem to point to the fact that there was little or no difference between the gold and silver issues when compared to the bronze from quite early on in the empire, all but eliminating a senatorial connection with the bronze issues¹. This may be due to coincidence, but more likely due to the mint striking the "senatorial" coinage being the same mint that struck the gold and silver issues from the reign of Claudius, or possibly even Caligula.

Therefore the base radiates derived from earlier silver issues and the bronze laureate coins often called denarii but seeming to share an ancestry with the gold issues are excluded for the most part.

Disregarding the large medallion bronze issues, which are very seldom encountered, the only Gallic usurper to issue a bronze coinage was Postumus. The debasement of the base silver radiate to a bronze looking piece, or at least to a coin which looked bronze after

a short period of circulation, by the late 260's effectively drove the large bronze "fractional denarii" out of circulation, a combination of inflation rendering the pieces worthless in terms of purchasing power and the metal they contained exceeding the value of the coins which they were supposed to be fractions of. This was not a purely Gallic phenomenon and within the Central Empire the large bronzes ceased to be manufactured in any numbers under Gallienus, although there are what appear to be minor issues under Claudius II and later.

The bronze coinage of Postumus has caused some problems over the years as there are, besides the well struck pieces of some artistic merit, a number of cruder examples, both struck and cast, which serve to confuse the arrangement of the coins and which cause some debate over their status as official coins. Before getting into classification difficulties of such issues it is perhaps worth concentrating on what we know of the undoubtedly official issues.

The mint arrangement for the base silver coins of Postumus expounded in chapter 5 above would apparently hold true for the arrangement of the bronze coinage. In the past there has been the debate over Cologne, Lyon or Trier for the base metal issues of Postumus. Whilst there may still be some shred of doubt in the minds of scholars that Trier was not the mint operating in the earliest years of Postumus and that Cologne only began to operate towards the end of his reign one may be more certain that the base silver and the official bronze issues share a common mint from the beginning².

To deduce that the silver and the bronze are from the same mint is not difficult for they

share many of the same reverse types as the base silver, that is, for example SALVS PROVINCIARVM, HERC DEVSONIENSI and VICTORIA AVG³. That is not to say that there are some reverses not utilised in the other two metals, for example bronze types exist with reverse types such as ADVENTVS AVG, EXERCITVS AVG and PROPECTIO AVGVSTI (for example Bastien types 10-11, 20-1 and 19)⁴.

One may also make a deduction about the hierarchy or the order in which the coinage metals were struck. In the earlier empire there is the assumption that whilst the bronze coins were marked as being under senatorial control, unlike the gold and silver, they were struck at the same mint but in a different phase of operation. That is, the mint would concentrate on striking only one metal at a time and, usually in a descending order of metals/denominations, thus working aureus to as⁵. If, as is proposed, the official bronze coinage was struck at the same mint as the coinage in the other two metals the initial issues were probably struck later than the ones in gold and silver. Evidence for this is in the rendering of the name of Postumus for mis-spellings of his name to Postimus (sic) are not found in the bronze coinage whereas they are recorded in both gold and silver⁶. The mis-spelt legends occur on coins which also have obverse portraits which bear more than a passing resemblance to Gallienus, a phenomenon not noted on the bronze coins.

The bronze coins of good ("official") style end with the issues dated to the third consulship, excluding the "medallic" issues (Bastien 128 to 138). These issues share obverse dies with reverses of VICTORIA AVG and FIDES MILITVM type and thus

have a parallel with the silver coins equating to Besly and Bland's issue 1c/2a⁷. This would seem to terminate the issue around the early part of 262AD.

As has been alluded to above there is a body of coins over which there is doubt over their origin, that is, the coins, whilst many are similar to official pieces in terms of their obverse and reverse type, they bear indications that they are not of the same mint and may not be officially sanctioned coins at all. Instead these pieces are regarded as not so much local copies but rather copies from a large production centre somewhere within the Gallic Empire. Bastien has chosen to split these coins into two branches.

First of all there is the group identified as "Atelier II" and secondly there is the catch all "diverse imitations"⁸.

How might these pieces in the above two groups be differentiated from the coins regarded as official?

Examination of the pieces published by Bastien, in particular the obverse / reverse die alignment offers one method for it can be observed that the official bronze coinage is struck at very regular die axes. That is the majority of pieces in Bastien's official group have reverses struck aligned to either 12 o'clock or 6 o'clock when compared to the obverse. The "Atelier II" coins and the "diverse imitations" do not exhibit any regularity when one compares die axes.

Secondly the question of style comes into play. Crude elements of either the obverse,

reverse or both betray a mint operating without the technical die cutting skills of the official mint. This is not always the case but die links will often lead to a crude die pairing. This and the above point are not sufficient to condemn the products of Atelier II to be an unofficial mint, merely a different mint to the best bronze products.

What may condemn the products of Atelier II to being those from an unofficial mint are the reported stylistic links between the bronze coins and the plated irregular antoniniani of Postumus that are particularly prevalent in France. Any mint manufacturing acknowledged imitations in silver and stylistically substandard bronze coins cannot be said to be striking forgeries in one metal and official coins in another. Common sense must prevail that they are either all official, which is unlikely, or that they are all unofficial. The latter explanation must be the most probable.

Finally there is the question of size. Whilst one may observe in the official coins types that represent sestertii (laureate bust) and double sestertii (radiate bust), both common, the as and the dupondius are rarely represented. However the Atelier II output and the diverse imitations are almost exclusively radiate bust pieces of a size which equates to the official laureates at best and which decline to be around the 4 gramme mark in weight, that is, equating to the base silver radiate. There is no attempt to perpetuate a multi denominational bronze coinage structure by issuing a laureate piece. This suggests to me that these pieces are not necessarily fraudulent issues, but made because of the necessity to fractionalise the silver after the large scale issue of official bronze ceased in 262. Small scale trade would certainly require some form of base fraction of the silver antoninianus to continue initially at least.

These unofficial bronzes show a decline in size through time. This becomes evidenced through the reverse types, for while many use the fossilised reverses of the official bronze, the galley, emperor and globe, Hercules and Victory types, the reducing radiate bronze draw upon the reverse types utilised on the current official base silver issues. Some have suggested that the small module crude radiate bronze coins are carelessly produced fractions of the sestertius. This view has not found popular acceptance and the reduction in size should be seen as either a reaction to the debasement of the silver coinage to ensure that the bronze does not become over valued or because of the scarcity of bronze available for coinage, given the lack of imperial bronze in the area after the end of the reign of Commodus⁹.

There are also a number of altered official sestertii of the second century emperors, whether they be overstruck worn examples of sestertii of Hadrian, Antoninus Pius and Faustina, for example, put back into circulation with the radiate bust of Postumus over stamped (for example Bastien 382-394). There are also pieces known where the bust of the original emperor has had a radiate crown cut into the hair, again to suggest a retarrifing as a double sestertius. This is evident on both Central Empire sestertii as well as those of Postumus (for example Bastien 33c, 85d, 100c1).

The end to the unofficial bronze issues of Postumus must come shortly after the debasement of the silver coins which took place between the fifth and sixth issues, that is, around 268AD. After this time the base silver radiate coin, whilst appearing silver when newly struck, soon takes on the appearance of bronze. The bronze imitations, whether they be double sestertii or, less likely, dupondii become less attractive to make

than the base silver radiates which are of similar weight and no longer requiring silver plating for them to be acceptable in exchange, especially in bulk transactions. Furthermore, the relative devaluation of the antoninianus would make it more suitable for everyday minor transactions and the need for further fractionalisation reduced, witness the demonetisation of the farthing or quarter penny in the early 1960's and the decimal halfpenny in the 1980's.

That this is so may be witnessed by an imitation bronze piece of Postumus which combines a garbled spelling of his name with the praenomen of Victorinus, thus reading PIAV POSTVNO (sic). As the praenomen of Victorinus is only used on his first two issues of base silver this would suggest a date of around 269AD or possibly slightly later for its manufacture¹⁰.

One must then examine the contemporary setting for the issue of the bronze coins. If we accept the premise that the bulk of the official mint production is of sestertii and a larger radiate, a double sestertius for arguments sake we may conclude that these approximately coincide with the first two issues of silver coins on the basis of comparison of the common reverse types. That would put their manufacture into the period 260 through to 262 using the chronology of Besly and Bland¹¹. Later large bronze coins of Postumus are known but their style and scarcity suggests a ceremonial or commemorative issue. Their issue would apparently coincide with events such as the quinquennalia, the end of the third consulship and the decennalia celebrations of Postumus. Their medallion nature, even if we are not to regard them strictly as medallions

themselves, that is, the unusual rendition of the bust of Postumus, must put them outside the mainstream of bronze coinage.

The Atelier II coins and other unofficial bronze coins tend to have an obverse bust that is radiate and, although the size may vary, may be said to represent the largest official radiate bronze coin of Postumus in denomination terms. When these coins begin to be made is difficult to assess for while a number of them continue to use the reverse types of the official bronze coinage we do not know whether their production started concurrently with the official pieces or as a result of the end of the officially produced bronze coins. We do know, however that their production continued into the late 260's at least and into the reign of Victorinus.

Within the Central Empire the bronze coinage was also faltering, again, no doubt, due to the debasement of the base silver issues thus greatly overvaluing the base metal fractions by the time of Gallienus last major alteration of the silver content with his fifth sole reign issue from Rome. Claudius II issues a series of rare asses from Rome which, if the reverse types and obverse legends tare with those of the base silver radiates may demonstrate that their issue was made throughout his reign¹².

One point of note is that the bronze had by now lost the mark SC linking its notional production to the senate. Rather than this being an indication of political changes it probably reflects more the sporadic nature of the bronze issues. This omission of SC was continued by Aurelian both on his inaugural bronze issue from Rome and again on the

next issue of bronze, coincident with the "XXI" reform. The letters SC made a reappearance on the limited bronze output of Florianus in 276¹³.

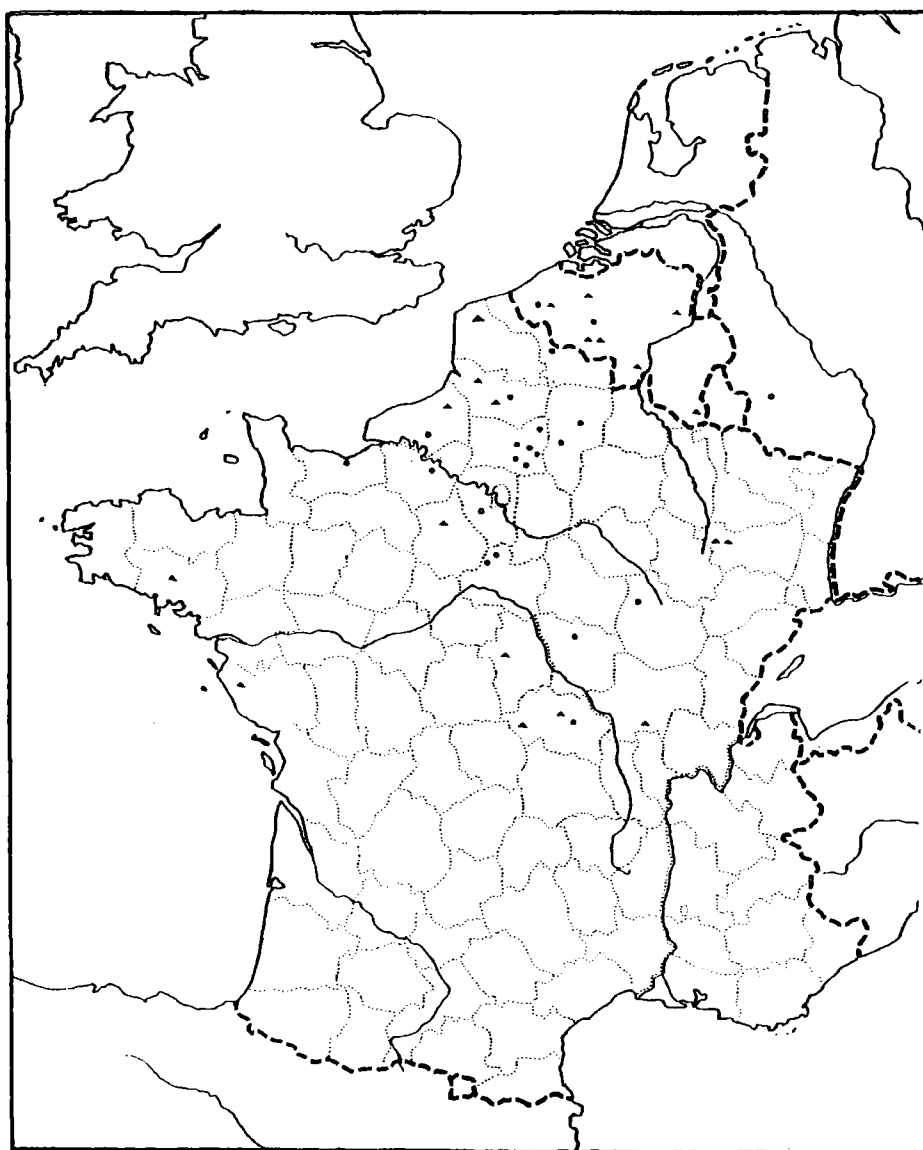
The study of the distribution of the bronze coinage of Postumus by Bastien included a map of find spots (figure 9.1). What is immediately obvious is that:

1. There are no recognised finds from the British Isles
2. There is only a single find from Germany
3. The distribution is concentrated in northern France
4. There are no finds from Lyon

These four points are crucial to the understanding of the bronze issues and their usage. Taking the fourth point first, Lyon has traditionally been ascribed as one of the main mints of Postumus, not just for the bronze coinage. The distribution of the bronze coinage away from there only serves to raise the question that if the city were a Gallic mint location why are the coins not found in the vicinity? It is true to say that now few, if any, believe that the mint was ever located in Lyon at this time.

By the same token, however, on Bastien's distribution one may also argue in the same way that Germany may not have been the mint location. However examination of the FMRD volumes is able to add a number of pieces, 20 plus, from northern Germany to suggest that the figures suggested by Bastien are not the whole story and some, if not all, are from catalogued hoards and site material rather than museum collections¹⁴.

ENFOUISSEMENTS SOUS LE RÈGNE DE POSTUME



- Monnaies de bronze du haut-empire et de Postume.
- ▲ Monnaies de bronze du haut-empire et *antoniniani* de Postume.

Figure 9.1 Bastien's map of the find spots of Postumian bronze coins

Similarly, with regard to the UK there have now been finds of Postumian bronze in Britain but they are still very rare and the total number with properly recorded find locations barely gets into double figures. Hollard (1992) lists six sites, mostly concentrated around the south east coast and thus the distribution suggests a diffusion of these coins from the continent, rather than being deliberately supplied to the province¹⁵. The dates in parentheses are those of Hollard, suggesting the date of deposition:

- Leysdown¹⁶ (260/1) - sestertius x1, double sestertius x1
- Ramsgate¹⁷ (260/1) - sestertius x1
- Bourne End¹⁸ (269/71) - double sestertius x1
- Gare¹⁹ (269/71) - sestertius x4
- Alcester²⁰ (266/7) - double sestertius x2
- Combe Hill²¹ (post 271) - double sestertius x1

A seventh site, omitted by Hollard, has produced a bronze of Postumus and is recorded by Shotter.

- Flaggrass²² (nd) - double sestertius x1

and another bronze of Postumus is listed in the catalogue of metal detector finds shown to the Yorkshire Museum in York between 1986 and 1997²³. This coin, an imitation of a sestertius (or more likely a double sestertius?), was found at Bolton, to the east of York, and is the most northerly find of this type of coin known to me. There are, I suspect, other bronzes of Postumus or their imitations that are found in Britain but go unreported due to the treasure laws in operation which mean that bronze coinage falls outside the recording system²⁴.

9.1 The Circulation of Gallic and Later Bronze

The distribution of the bronze coinage of Postumus is very distinctive when one looks at the find locations, the concentration being around northern France, Belgium and Holland. One may ask what was the reason for the bronze coinage to be issued in such a restricted area? Alternatively this could be approached from the opposite point of view, that is, what caused the bronze coinage to aggregate in this area?

There has been a suggestion made that the bronze coinage of Postumus represented a departure away from the routine Imperial bronze coinage in that it was valued above the notional sestertius and larger double sestertius and that these were emergency issues of the silver coinage values at a denarius and radiatus/antoninianus respectively²⁵. There may be some support for this hypothesis if one looks at the distribution of the issue I and II silver coins, the issues that were made at a similar time to the official sestertii and double sestertii. As a proportion of the total issues of Postumus France seems to have

fewer issue I radiates as both hoard and site finds when compared to, say, Britain and Spain. The bronze coinage has been viewed as a "fill in" where army loyalty to Gallic rule was not in doubt. Spain and Britain were further from the seat of the revolt and the loyalty may have had to be won over so the priority for the first issues of silver coinage were further afield than northern France.

Even if these coins are not "token" antoniniani and denarii their distribution may be linked to propaganda and troop loyalty. Many of the bronze coins of Postumus, sestertii and double sestertii, are overstruck on earlier sestertii. This suggests that their issue was not necessarily connected with providing bronze coins to circulate in the area as bronze were available to provide the donor coins for the restriking and whilst some in some of these cases there is a revaluation old sestertius to new double sestertius in others there is not.

The illustrations from Bastien's plates tend to show double sestertii overstruck on earlier sestertii with the old design still in evidence. One must not only look for evidence of the design that is still available but also the coinage metal that is used. A number of the "bronze" coins of Postumus have the brassy appearance of late first or early second century bronzes manufactured from orichalcum (a copper alloy with a high proportion, c.10-25% zinc), material typical of the Trajanic or Hadrianic coins identifiably overstruck with types of Postumus²⁶. There are not sufficient published analyses of the bronze coins of Postumus to determine the extent to which this was done but the sample of eight analyses published by Bastien which show little or no zinc (<0.1%) may be misleading²⁷.

One may take the intermittent use of SC, signalling a break or change from the traditional bronze coinage, and the occurrence of mixed silver and bronze hoards as supporting this. Traditionally mixed silver and base metal hoards were rather unusual and the third century deposits with significant numbers of both bronze and silver marks a departure from the norm, for example the find from Vannes which contained 458 sestertii (including 3 of Postumus), 16 denarii (from Septimius Severus through to Gordian III) and 96 antoniniani (terminating with 17 of Postumus)²⁸.

However two things should be borne in mind. Firstly the SC mark was used only intermittently on the Central Empire bronze from this period, particularly in the period after the reign of Gallienus and before the reign of Florianus (268 to 276 approximately). Thus, the meaning enshrined in SC from the time of Augustus some 250 years previously may have become less important or even forgotten altogether. It is not just a feature of Gallic bronze.

Secondly an examination of the hoards reported by Bastien as containing both base silver coins of either Gallic or Central origin from the 260's along with bronze coinage of either Postumus or the Central Empire shows that in the majority of cases either the silver is dominant or the bronze is dominant to a substantial degree²⁹. This skewing towards one or other metal is very pronounced, for example the Ardres find of 352 coins (350 silver plus two sestertii of Postumus) and Bourges (11 second century bronze plus a silver antoninianus of Postumus)³⁰. It must therefore be suggested that the segregation of silver and bronze coins was still taking place to a greater or lesser degree and that one should perhaps not read too much into the reported mixed metal finds.

What is significant to the distribution of the bronze issues of Postumus is the economic nature of the area in which the coins are found.

It has been noted by Thurion (1967) that bronze struck after 190 AD did not circulate widely in Belgium, a feature also noted by others such as Buttrey (1972) who also comments that throughout the Gallic Empire there are hoards of first and second century sestertii (bronzes of other denominations are specifically excluded from the discussion) deposited in the mid third century AD and thus the latest date of coin present in such hoards is of no use in determination of the date of deposition or period of assemblage^{31,32}.

Buttery also considers the circulation, or rather the distribution, of sestertii struck in the third century. African sestertii hoards contain a significant number of post Commodus "large bronze" in mid third century hoards, a similar pattern is also noted in Italy. Spain, on the other hand, has no positive third century sestertius finds reported.

Further supporting evidence of economic need for small change is suggested indirectly³³. When studying the importation of goods into Britain it is noted that as well as the observable imports, pottery for example, there was a certain amount of perishable food stuffs that were also imported aboard the same vessels, 'freeloading'. There is a marked decline in the amount of imported goods being excavated from British sites from the second and third centuries. It is suggested that this may also be used as a surrogate measure for the decline in importation of perishable goods, Britain being somewhat self sufficient (I must stress that using negative evidence or the absence of a type of material

or product is fraught with danger and this must be doubly so when the item is of a perishable nature). The self sufficiency, rather than international trade lends itself to barter or exchange to circumvent shortages in small change.

Does the need for an ample "small change" coin pool reflect international or long distance trade that is taking place? Africa was an emerging trading nation, and, on the basis of pottery excavated, much of this trade was with Italy. The export in garum and olive oil from Africa to Italy had all but stopped the Iberian trade with Rome^{34,35}.

Jones (1964) is useful for background information on manufacturing and trade, although the period covered is later than the Gallic Empire³⁶. Some basic principles and distributions of industry must still hold true. Two important premises are espoused:

- There was a concentration of industry in northern Gaul
- Bronze coinage was important in retail trade

Bastien and Victor (1979), like Huvelin et al before, suggest that the popularity of the sestertius/double sestertius issues under Postumus may be its apparent stability within the Roman coinage series^{37,38}. The silver antoninianus was declining rapidly in terms of both the quality of the alloy and the weight of the coin. The reduction in weight would have been noticeable and similarly the change alloy detectable by the 260's. The sestertius had declined by about 25% in weight compared to the time of Augustus and the zinc content of the alloy also declined (by approximately 75%)³⁹. This decline in alloy

would possibly not be so detectable as in the silver coinage and therefore the intrinsic worth of the coin would be more attractive, if not in real terms then by its apparent stability.

The localised hoarding of both official and unofficial bronze coinage of the Gallic Empire is confusing. The occurrence of these coins in areas where there are apparently ample bronze coins of earlier reign, unlike other parts of the province suggests a reason for the distribution, whether it be a commercial or propaganda reason. The continued imitation of the coins suggests that the reason was, perhaps, driven by use/need or, possibly, overvaluation of the type.

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CHAPTER 10 - LOCAL COPIES AND POST GALLIC EMPIRE COIN CIRCULATION

One of the most confusing aspects of the coinage of the later third century is the array of coins which are of unofficial manufacture. Until the publication of the coins of the Gallic Empire by Elmer in the early 1940's which not only sorted out the official coins from the irregular issues but also made an attempt at arranging the coins into coherent mint and chronological sequence, the method of listing coins was by reverse legend in alphabetical order¹.

Prior to this publication the last major catalogue of the series, volume 5 of the Roman Imperial Coinage, had made a start in mint identification which was not particularly satisfactory with hindsight². A more serious flaw exists however with this work and that is the inclusion with undoubtedly official pieces of a large number of what must be regarded as unofficial products within the radiate base silver series. The inclusion of these pieces should not, on the face of it, cause too much of a problem given the appearance of Elmer's catalogue some seven years later.

However this is not the case as Elmer's work was not made widely available until 1967 with the issue of a reprint of the original paper as a monograph. Unfortunately the Second World War somewhat restricted the printing and circulation of the Bonner Jahrbücher and thus we find that publication of British and French hoards still using Roman Imperial Coinage until the 1970's. The nett result being that a number of dubious coins are accepted as official products within the hoard statistics and causing some confusion over numbers.

Further confusion occurs in the publication of hoards in the type of irregular coins encountered. As far as I am able to ascertain the copying of coins in the period 260 to 280 may be divided into three groups, the boundaries of which are indistinct and difficult to define.

Initially, coming into the period in question, there appears to have been a group of copies of the silver antoniniani that are well made, possibly using dies made from official coins or manufactured from reasonably well executed dies. The copies were given a silver appearance either by plating or possibly manufacturing the coins from a base silver, more base than the prototype specimens, in order to make a profit. The skill with which the pieces were made indicates that they were meant to deceive, an important factor.

The Stevenage hoard which terminates with coin types from 263AD contained 66 irregular coins of Postumus, approximately 10.5% of the coins for that emperor in the deposit³. Also included in the hoard were imitations of antoniniani of Trajan Decius, Valerian and Gallienus along with plated denarii of Julia Soaemias and Severus Alexander. What is important about this group of forgeries is that there are a number of die links, both within the hoard but also to other finds, including a cross channel link to Rocquencourt in France, suggesting that, while this group of coins was probably made in Britain, they were of competent enough style to be used in longer distance trade⁴. Similarly an examination of the good quality imitations of antoniniani of Postumus in the Cunetio hoard is also able to reveal die links with a number of continental hoards, perhaps reinforcing the deception motive for their manufacture.

One must regard as a subgroup of this the group of Gallic imitations cast from clay moulds which were made from official coins. This is an extension of the fraudulent manufacture of Roman coins to deceive in transactions. A group of such moulds were discovered at Whitchurch, Somerset, initially in the nineteenth century with more being discovered during the systematic archaeological excavation of the site⁵. The publication of the find places their manufacture in the later third century, probably ceasing around 274⁶. This, I feel, is correct, as their manufacture must have ceased before the local radiate production as the moulds are for coins of the correct size. The majority of the "local radiates" are of a reduced module, sometime quite drastically so. It would not make sense to waste material producing large coins if one could get away with making more smaller coins out of the same volume of material.

The second group of imitations to be identified are the predominantly very base, if not wholly base issues in the series traditionally known as "barbarous radiates", perhaps better labelled "local radiates". These coins, usually struck, often feature types which are Gallic in origin on one side if not both. Frequently their crude style and/or the reduced flan size easily betray their unofficial nature. Thus it cannot be conceivable that these coins were made to defraud the population, their detection would be too simple. One must look for another explanation and the most readily acceptable is that they represent an emergency coinage during a period of monetary shortage, a phenomenon that I shall expand further later.

Historically they were regarded as a coinage from the Dark Ages, borrowing their designs from the Roman coins that remained evident. This was partly due to the Anglo

Saxons actually making use of Roman coins as prototypes for some of their issues. Secondly the reduced module and often confusing designs of the smallest radiates suggested links to the reduced module imitations of fourth century coins, in particular the FEL TEMP REPARATIO copies using the substantive type from the late 340's/350's. The discovery of a local radiate hoard under a sealed layer in the Verulamium theatre securely separated the radiates from other small local imitations and provided a terminus ad quem of c.300 AD⁷.

A third group, often confused with the previous ones are the so called fraudulent Rome mint issues. There is no certain way of differentiating these coins on the basis of style although one may eliminate coins with Gallic Empire prototypes from the corpus. Markus Weder sets out some rules for identifying these pieces but accepting coins into this group whilst rejecting others is still controversial⁸. It has significant implications when considering western coin circulation and the local Gallic copies. Which are of Gallic manufacture and which are imports to the area? Further confusion has been added by the recent discovery of radiate copies in North Africa. It begins to look like the phenomena of imitation radiates is much more widespread than initially thought.

One type of copy coin has interested me more than others and that is the DIVO CLAVDIO imitation. These are perhaps the most frequently encountered Central Empire types that have been copied in the area of the Gallic Empire. The initial question was how was a Central Empire type available to be copied if there was no access to Central Empire coinage? It has hopefully been demonstrated that there were movements of such coinage in a westward direction, particularly after Postumus's debasement of the silver

coinage in 268, however there was not necessarily a reciprocal movement towards the east.

Thus once the idea is established that the Central Empire coins are available in Gallic areas to be copied can they be used to determine when the copying was done and when it was at its height? The advantage of using the DIVO CLAVDIO coins is that the type is readily identifiable, even when it is rendered in the most crude way, the square altar or eagle being distinct types unlike a standing deity. A further advantage is that the prototype coin was issued before the hypothesised beginning of the production of local radiates.

For a number of hoards greater than 70 coins which terminal official coin dates in the period 270 to 300 the number of DIVO CLAVDIO copies were tabulated and the percentage composition of the hoard plotted against date (table 10.1, figures 10.1-2). There could well be some contamination with the fraudulent Rome mint issues but whilst one must be mindful there is no way to eliminate it given that one is relying on the assessment and judgement of others.

The two graphs, Britain and mainland Gallic Europe, show a broad agreement in the occurrence of the imitation DIVO CLAVDIO types between them. The copies begin to occur in hoards terminating with official coin dates of 274AD and rising in proportion through to the late 280's after which there is a decline. A number of points must be made about this.

Hoard	Date of last 'official' coin	Total coins in hoard	No. Divo Claudio copies	%
Oliver's Orchard I	269	1558	0	0
Bassaleg	269	904	0	0
Wareham I	271	1569	0	0
Market Deeping	273	2868	0	0
Oliver's Orchard II	273	4071	0	0
Wickham Market	273	1588	0	0
Cunetio	274	54951	74	0.13
Botley	274	1399	1	0.07
Cadeby	274	1681	2	0.12
Aldbourn	274	5077	45	0.87
Chalfont	274	6682	31	0.46
Mytholmroyd	274	597	0	0
Meare Heath	274	1404	26	1.85
Chalgrove	279	4145	45	1.09
Minster	281	3235	52	1.61
Tattershall Thorpe	281	5074	10	0.2
Child's Ercall	281	2897	0	0
Coleby	282	7767	142	1.83
Appleshaw	282	3052	69	2.26
Maltby	282	3496	4	0.11
Much Wenlock	284	2591	11	0.42
Monkton Farleigh	286	3466	80	2.31
Normanby	290	47909	898	1.88
Hove	290	455	39	8.57
Bath Area'	296	1807	3	0.17
				.
Malicorne (F)	270	1050	0	0
Bonneuil-sur-Marne (F)	270	1759	2	0.11
Forges-les-Bains (F)	274	1109	0	0
Brauweiler (D)	274	2623	21	0.8
Auvilliers (F)	274	907	14	1.54
Caudebec-les-Elbeuf IV (F)	274	73	2	2.74
Tournai 17 (B)	281	1183	1	0.08
Saint-Maurice-de-Gourdans (F)	284	1272	23	1.81
Bavai (F)	287	6659	977	14.7
Authieux II (F)	294	1091	61	5.59
Thibouville	296	3256	16	0.49
Montbouy (F)	310	3310	331	10

Table 10.1 DIVO CLAUDIO copies in Gallic hoards

Figure 10.1: DIVO CLAVDIO imitations
UK hoards

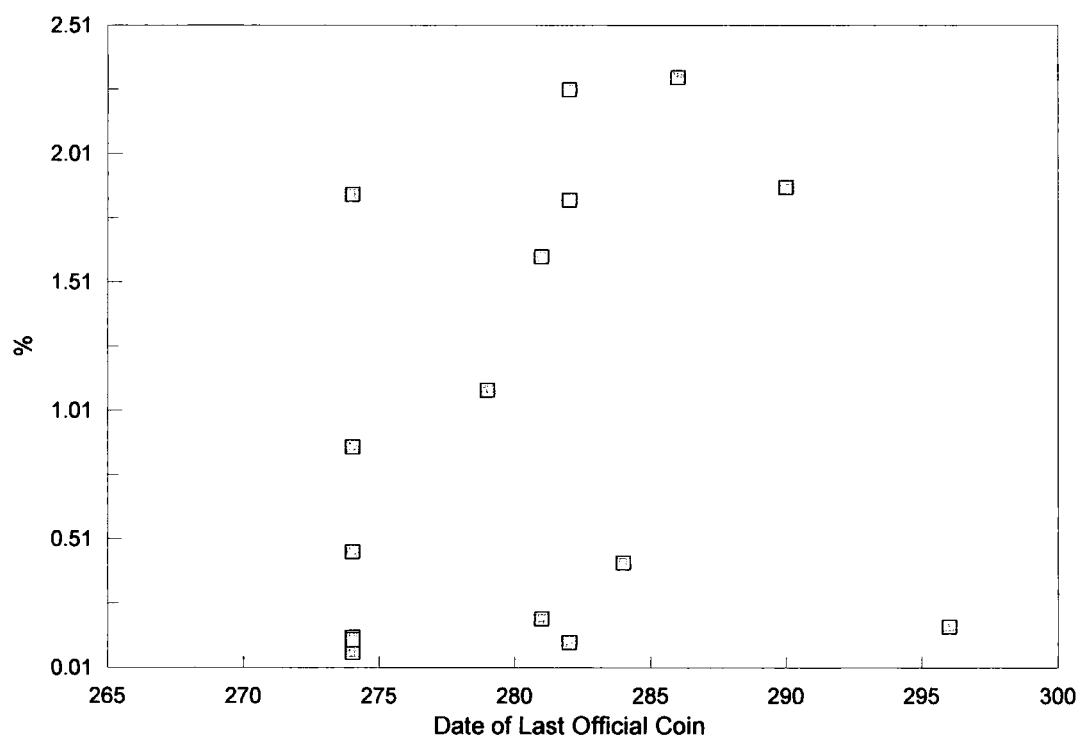
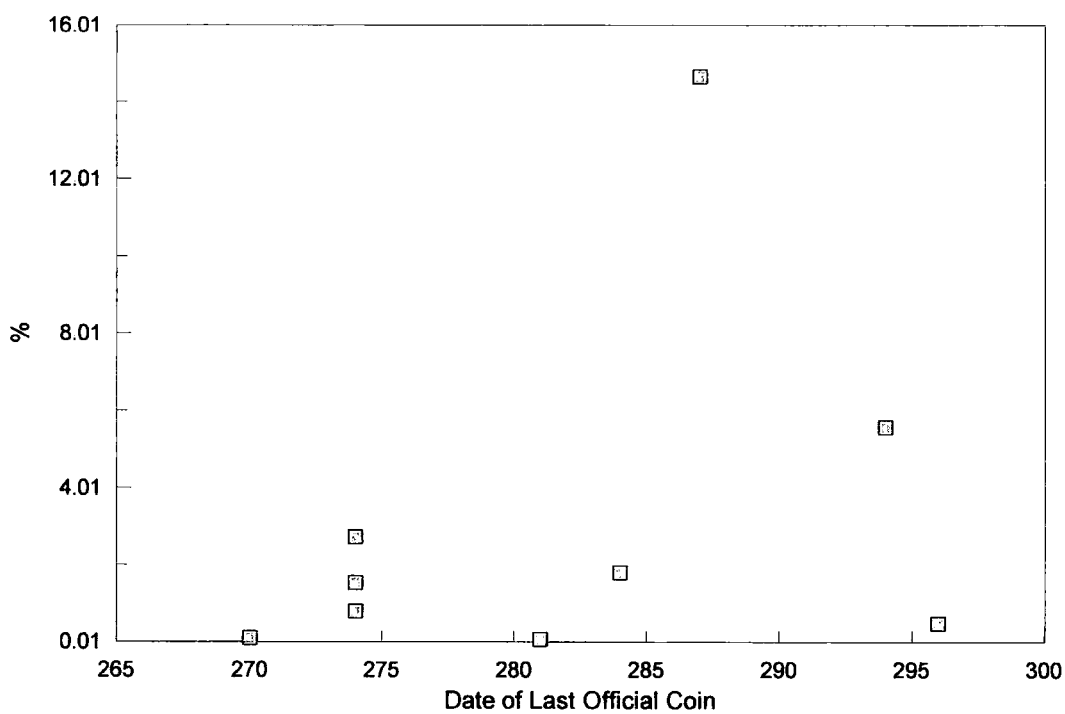


Figure 10.2: DIVO CLAVDIO imitations
European hoards



First of all the initial appearance of the copies is in hoards which contain the last issues of the Gallic Empire. This could indicate that their production is beginning around this period or they are becoming accepted as part of the routine currency at this period and therefore accepted into hoard deposits without fear of demonetisation or lack of acceptance in the future. If there was the fear of imminent non acceptance then preference would be given to officially produced coins. The appearance of cast Gallic copies in hoards before this date suggests that good DIVO CLAVDIO copies are not in circulation at the same time otherwise they too would have been included in earlier hoards.

Secondly the proportion of copies in hoards increases from 274 through to approximately 290AD in both British and French deposits. This period is a period of perceived monetary stress in the recovered territories, particularly northern France and Britain, as there is a paucity of base silver post Aurelianic reform radiates in hoards. It is postulated that for some reason the coins are not circulating in the area whether as some form of official sanction against the previously rebellious territories or as some local sanction against the Roman State^{9,10}. Both of these hypotheses I find difficult to accept at face value.

The Roman government would need to engage in payments after retaking control of the area after the fall of the Gallic Empire but if the majority of State monetary transactions or shipments/movements were as either gold coin or bullion then base silver would not be required and therefore no evidence would remain.

The retention of a mint in Gaul located at Lyon surely shows an intention to supply base silver coinage, although its transfer from the north (Trier?) to Lyon is perhaps indicative of a policy to separate the manufacture and supply of money away from the military concentration in the northern Rhineland. The close links between the army and the location of the newly established provincial mints during the third century allowed for the continuation of pay to rebellious garrisons, sustaining their support for their leader. By severing the link between, particularly, the Rhine garrisons and the mint there would be a lessening of the risk of further revolts in the recently recaptured region.

This may also be the beginning of a reason why the post reform coinage of Aurelian is so infrequently encountered in hoards from northern France, Germany and Britain. When the mint was located with the soldiers there was not an issue in transporting bulky, low value coins to the soldiers as they were located relatively close to the mint. Longer distance movements of money however become costly if low value coins are used, therefore these payments are made in either gold or tax credits. Reece's diagram of local circulation comes into play with money changers fractionalising the gold enabling local transactions and the gold is then recycled via the fiscal mechanism. The only way the new aureliani can enter the area is by relatively small volume trade with areas where the new coins are circulating.

This shortage of base silver coinage was possibly exacerbated by a perceived decline in western exports to Italy in the face of North African competition, thereby removing a mechanism for additional radiates to infiltrate into the northern coin pool¹¹.

The mass of obviously false coins circulating must have had a further knock on in that adjacent areas may have been reluctant to accept the local radiates, further isolating the area from trade and reciprocal movements of coin for whilst imitative coins are found throughout the Roman Empire in the later third century, for example the vast number of DIVO CLAUDIO copies found in the excavations at Conimbriga in Portugal, those bearing prototype designs of Gallic Empire origin are almost exclusively found in Britain, northern Gaul¹². A small number of Gallic Empire imitations were found at Conimbriga but they are vastly outnumbered by the DIVO CLAUDIO copies¹³.

I cannot readily accept an alternative hypothesis of there being local sanctions applied against the post reform aurelianus. The main usage of base silver coins are in local transactions especially with the demise of the bronze fractions. There must be logistical difficulties in organising a boycott of the official coin on such a large scale as northern France and Britain.

A third hypothesis is that there was a need for a two denarius radiate. I have already discussed the relationship between the pre and post reform coinage of Aurelian and that the new coin probably has a worth of twice that of the old radiate¹⁴. There is no large scale fractional coinage below this still being produced. Does the need for a two denarius piece for the local population to continue their manufacture? Is there a commodity of service, may be peculiar to the area, requiring such a denomination? One may also see the continued production of the radiate double sestertii during the 260's the same way.

This hypothesis does have a historical precedence within the Roman world. The

distribution of the base metal quadrans during the first and second centuries is so restricted, the majority of specimens being found within the environs of Rome^{15,16}. This distribution, by denomination rather than issue, may have been governed by the use of the coin involved in that the quadrans, the lowest denomination being produced by the Roman mint, was the accepted fee for use of the public baths and with Rome being probably one of the most populous urban centres is perhaps no surprise at their concentration there¹⁷. This concentration of the smallest aes denomination within Italy caused problems in other parts of the empire and there are examples of asses and dupondii being cut into halves¹⁸.

However, there seems to have been a shortage of coin, or at least a perceived shortage that is now reflected in the coin finds, both hoards and single specimens, of the post Aurelianic reform radiate and it is postulated that in these areas the locally produced radiates are thought to bridge the gap and fulfill the everyday monetary needs.

A classification has been attempted on more than one occasion of the local radiate production to try and temporally organise their production partially on the basis of style and or size^{19,20}.

Class	Flan	diameter	weight	issued	circulated
1	large and thick	15 - 20mm	1.2 - 2.8g	274 - 280(?)	274 - 282/5
2	large and very thin	12 - 16mm	0.6 - 0.8g	about 282?	?
3	small and thin	10 - 12mm	0.4 - 0.6g	after 280	c.290 - 310
4	very small and thick	7 - 9mm	0.5 - 0.8g	after 282	c.290 - 330

Classification on these two parameters cannot be applied rigidly. One only has to look at the different abilities at sketching amongst a group of people today to see that there is profound variation, indeed, some artists even trade on their naïve or abstract approach. Die cutting amongst amateurs must therefore be open to variation and if, as is suggested, the local radiates were produced to meet a local currency shortage and there was no intention to deceive the people accepting the pieces then artistic free rein may come into play.

Similarly the money of necessity aspect of these coins suggests a shortage of suitable coins wholesale and therefore a shortage of suitable coinage metal. Thus the size of coins produced diminished with the increasing scarcity of available metal and increasing demand for coins. Metal scarcity would, naturally, vary from area to area thus strict size criteria surely cannot be applied as it is unlikely the shortage of metal would become so acute universally. Boon cites an example of an official radiate of Postumus scored into quarters as realisation of the scarcity of metal and thus the acceptability of fractionalising a radiate in order to make four local radiates along with an example of a quartered of a radiate of Tacitus, the fractional coins being accepted at the rate of the whole piece otherwise there would be no reason to cut them up²¹.

Whilst I can accept the reduction in size of local radiates with increasing scarcity of metal I cannot reject the fact that these fractionalised radiates resemble the cut half pennies and farthings of the Anglo Saxon, Norman and Plantagenet period. Others too have made the suggestion that the reduced local radiates of the late third century are not

a money of necessity but are an attempt by local communities to provide a useable fractional coinage, the reformed radiate of Aurelian having too high a purchasing power to be of use in small transactions and there being no widely circulating official fractions. If this were truly the case surely the extant reformed radiate coins, the "XXI's", would be more numerous?

Further support for the paucity of current coin spawning a rash of imitative specimens may be gleaned from the FEL TEMP coins from the middle of the next century. It has been demonstrated that this series of coins was counterfeited in two phases. The first phase of counterfeiting, soon after the initial issues of the series were made around 348AD when the silver was systematically removed from the coinage alloy before restriking the remnant leaded bronze alloy back into coins of an approximate size to the originals²². The second wave of copying apparently takes place some time after 353 and the revolt against Magnentius. The number of issues made from the Western mints of Trier, Arles and Lyons reduces from >4 per year to ≈ 1 ²³. This statistic, although crude, may be used as a surrogate to suggest that the production of the FEL TEMP REPARATIO issues at these mints was dropping. It is in this period that the reduced module FEL TEMP copies are placed, the size reducing as available material dwindled to maintain the number of coins required for every day economic functions. No attempt is made in this phase of copying to sustain the size of the coins.

When and why did the production of this series of imitative coins end? Doyen's dating suggests that the last were made around the early to mid 280's although they certainly

occur in later deposits, another contributing factor in historically later dates of production being given.

Realistically radiate production cannot have gone on much later than the Diocletianic reform, c.294-6, when a new base silver currency was introduced. These coins do turn up in hoards in Britain and northern France and so if the local radiates were a money of necessity, as is suggested, their use would dwindle as official coins took their place. The same would be true if the local radiates were produced for fraudulent reasons, the new coinage gradually making obsolete the older style money.

There are few hoards which contain significant numbers of both pre and post Diocletianic reform coins, suggesting exclusivity. One notable exception to this rule is the Montbouy (Loiret) hoard, terminating c.309AD, which contained 3310 coins (2202 folles, 1106 radiates and 2 denarii)²⁴. Of the 1106 radiates only 3 are described as local radiates, that is, imitation. However there are 335 coins listed, 331 of them deified coins of Claudius II, as being of uncertain workshop or mint. This identification is not very helpful as it could embrace official coins of poor fabric, fraudulent products of official or unofficial mints and local radiates of excellent style/good size. It does suggest however that the most blatant local copies were excluded and were no longer a significant portion of the circulating coins.

Another event which had an effect on the coins circulating in Britain is the revolt of Carausius and Allectus, 286/7 through to 296. This period saw the establishment of a mint in London and probably another British location, thus leading to a fresh input of

officially sanctioned coins. There was also the remobilisation of older coins in this period, evident in the plot in chapter 6 above, where confidence was restored in the old large money, compared to the reduced size local radiates. Further evidence in this remobilisation of the older coins is the overstriking early in the reign of Carausius of Gallic Empire and Central Empire coins of people like Gallienus. Examples of this practice are clearly visible on the Normanby hoard plates (see for example coins 1666/1, 1573, 1574, 1592/1, 1607, 1610 where the undertypes are visible)²⁵. The remonetisation of Britain during these reigns may have suppressed the need for local radiates but there was left a group of craftsmen with die cutting and coining skills and there resumed a production of fraudulent coins of reasonable module, imitating Carausius, Allectus and later emperors.

Further evidence for the cessation of the production of local radiates comes from the discovery of a number of "coiners dens", particularly around the Bristol Channel. These deposits contain not only highly die linked groups of coins but also the raw materials of their production²⁶. It is interesting though that this site and other proposed production centres such as Sprotbrough in Yorkshire, Coygan Camp in Camarthenshire and Heidenkopf near Trier have all produced evidence of possible minting activity, for example, furnaces, crucibles, metal rods and the coins themselves, I am not aware of any actual coining dies being found^{27,28,29}. It has been suggested that these deposits were hurriedly made, possibly in the light of a campaign by the sons of Carus, Carinus and/or Numerianus, in the early 280's and, indeed, the title Britannicus Maximus is awarded to them both by late 284³⁰. There is no indication as to the reason for this acclamation, whether it was a campaign directly against the local radiate manufacturers or some other

threat to the empire in the northern provinces which then acted as a catalyst for the cessation of production by, for example, the increased imperial presence.

The postulated campaign sometime in the period 282-4 also ties in with the latest known local radiate obverse prototype, namely the coins of Probus (276-82). Central Empire prototypes after the coins issued in the name of the deified emperor Claudius Gothicus are difficult to identify and the latest emperor to be securely identified in these issues is Probus, although these are not common. The irregular nature of the pieces, frequently with partial and blundered legends, and their often crude manufacture with sketchy die cutting has led to spurious attributions being made. Pieces with purported busts of the empress Magnia Urbica and Carus are not capable of being substantiated and are probably based upon earlier types or, for that matter, upon later prototypes from the 330's onwards when the imitative coins once again reached such a small module ^{31,32,33}.

This then seems to give us a relatively secure time frame for the manufacture of the local radiate coinage, along with a suggestion that the function was to serve as a fraction of the gold coinage, rather than as a fraction of the new aurelianus in the wake of the removal of the northern Gallic mint(s) to southern Gaul and the consequent lack of new base silver coins circulating within the northern territories. It was an expedient to allow the continuation of the normal economic functioning of the areas affected by the lack of suitable available coins only rectified by the probable remonetisation in the early to mid 280's and the certain remonetisation by the revolt of Carausius in the middle of the decade.

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CHAPTER 11 - ECONOMIC INDICATORS

So far much of this work has dealt with the coinage of the late third century and particularly those issues made between the years 260 and 274. An examination has been made of their hoarding patterns and area of circulation as well as their temporal removal from the coin pool into hoards and casual losses for example. This circulation and movement of coinage is not undertaken on a whim but rather it implies a need for the transfer of wealth or value for a reason and that reason is economic activity. It is the purpose of this chapter to examine what we know of economic life in the latter half of the third century.

Traditionally this period has been viewed as a period of general confusion, the glory that was Rome in the first and second centuries was waning and with this general decline the economic fortunes were assumed to be also assumed to be reversing.

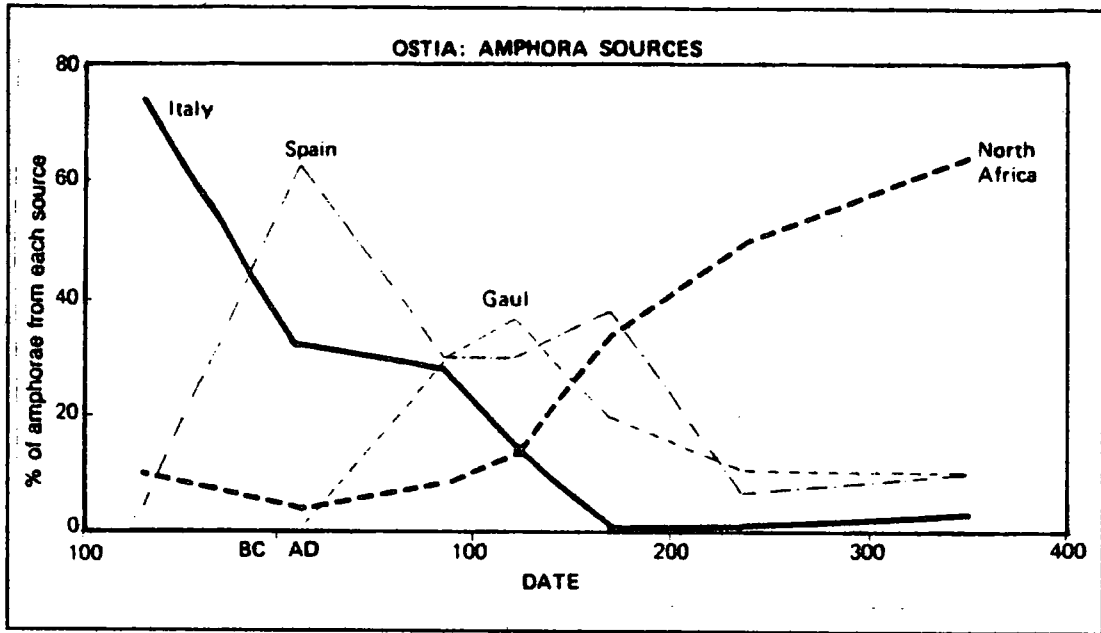
Evidence for this reversal of fortunes is widespread, for example the decline in Mediterranean seaborne trade is postulated by the decline in the number of wrecks that have been detected after beginning of the third century¹. This is only a very crude measure and relies on simple probability that the more seaborne traffic then the greater number of wrecks there are likely to be. This, however may be too simplistic an approach and does not take into account a number of factors such as ship design, piracy/attacks, weight of loads carried (ships may have sailed overloaded during one or more of the periods under consideration) and alternate sources/destinations and methods

of transport, along with difficulties in establishing for certain what approximate date the ship actually sank.

Another suggestion is that there was a decline in Baetican and Tarraconensian oil and garum exports, particularly to Rome during the third century. Evidence from this is based on amphora evidence from Rome and also from destruction layers encountered in Southern Spain and Portugal along with written evidence of tax shortfalls^{2,3}. The excavation of the Terme del Nuotatore and the mountain of broken amphorae, the Monte Testaccio, in the Roman port of Ostia demonstrates that from the late Severan period, that is the 230's onwards, there was a marked decline to virtually none in the traditional form of Spanish garum amphorae (Beltrán IIB, Pélichet 46 and Dressel 14 forms). A new type of amphora form is recognised from this period (Almagro 50) however the numbers encountered do not account for the shortfall in other types of vessel. By the 260's Spanish oil amphorae have also disappeared from this waste pile.

It is in the late Severan period that African vessels overtake those of Spanish origin (figure 11.1)⁴. It is tempting to view this as African competition forcing out Spanish opposition on the grounds of proximity, with the final nail in the coffin being the establishment of the Gallic Empire in 260 enforcing a break in the linkage of supply allowing African imports unimpeded access to the Roman market.

This may not be the whole picture and it has been suggested that there were changes in the shipping arrangements to Rome which meant that Ostia was not the sole port of



11.1 Quantification of amphorae from excavated deposits at Ostia (from Curchin, 1991)

entry for goods bound for Rome and that Portus, located further north, was the more significant port during the later empire⁵.

Furthermore there is evidence to suggest that the export of Baetican oil and wine continued through the third and fourth centuries as amphorae have been found from these later contexts from, for example, Germany and Britain, suggesting that there was perhaps even a concentration on these alternative market areas⁶. This exploitation of these markets may have resulted from being out competed in the Italian trade by African exports or the realisation of an opportunity in an alternative area.

Further confusion to the dating of pottery may be added by the questions raised over the length or period of production of specific pottery types. That is, the dating of types being too coarse for interpretation within the very narrow timescale of this study and revisions in the dating structure do not help matters. For example, looking at African Red Slip wares (ARS) the following dating structures have been suggested:

	Ogilvie (1965) ⁷	Hayes (1972) ⁸	Tortorella (1983) ⁹
ARS I	Mid 1st Century AD to mid 4th Century AD	Late 1st Century AD to mid 3rd Century AD	Production through to c.400 AD
ARS II	Mid 4th Century AD to mid 5th Century AD	c.220 AD to 400 AD	c.3rd/4th Century AD
ARS III	Mid 5th Century AD to mid 6/7th Century AD	c.300 AD to 7th Century AD	

Table 11.1 Comparative dating of African Red Slip wares (ARS)¹⁰.

As can be seen from the above table there is not only a broad dating band for each of the distinctive types but also considerable disagreement over the precise dating. Furthermore it is believed that there is a considerable overlap in production period.

The evidence provided by the destruction layers encountered in southern Spain has also been placed under scrutiny. Historically these destruction levels, as well as those from Gaul, have been associated with the barbarian invasions of the latter third century, providing evidence, along with the numerous coin hoards of the period, of widespread disruption to daily life¹¹. Can scorched levels and horizons of destruction be associated with a general abandonment and decline, whether in the face of barbarian threat or economic decline? Sensibly the answer must be a no on the whole. What must be remembered in these days of electric lighting and fire retardant fabrics is that we are dealing with a past age where lighting, heating and cooking were provided by naked flames and that many of the construction and domestic materials were made of inherently flammable materials. One should not be surprised or read too much into burnt layers within these contexts, the result of accidental fires.

An examination of the over all pattern of rural occupation and development concludes that many of the sites which show evidence of destruction or damage in the mid to late third century also show some evidence of rapid reconstruction rather than a permanent abandonment¹². The exception to this generalisation is that Belgica, North Gaul and Italy show low levels of reoccupation after third century destruction and this may support the traditional theory of barbarian invasion within this period¹³. This is perhaps particularly

so on the northern coastal regions of what are now France, Belgium and the Netherlands.

Urban decline is also talked of with regard to the third century with, perhaps, a movement of the population to more rural locations, particularly in Britain. Evidence for such decline has been suggested by looking at the areas encompassed by the walls that were being constructed around towns and cities from the early third century onwards, although on the basis of coin evidence a number are post Gallic Empire in date (for example Amiens, Beauvais, Toulouse and Famars have coins ranging from Aurelian through to Diocletian embedded in the mortar)¹⁴. The walls do not generally enclose the entire urban area that had been previously occupied and this has been used to suggest contraction. At Tongeren only 45 to 50 hectares are enclosed, approximately one third of the site, similarly Reims is also reduced to the same degree whilst the walled area of Amiens was 10 hectares compared to an occupied area of 120 hectares^{15,16}. Furthermore examination of the material used in the construction of the walls reveals reuse of materials such as from civic or religious structures, again being used to postulate decline and dereliction of parts of the urban landscape.

In Britain there is a lack of new building in stone within the towns generally after the first quarter of the third century which adds to the picture of urban decline through to the beginning of the fourth century when it is postulated that many of the old towns were no longer functioning as such¹⁷. The existence of layers of dark earth within the old urban areas being used to suggest that these areas were being used for cultivation rather than occupation¹⁸.

However this is not the whole picture as it has been shown that a similar decline is not in evidence in Italy, North Africa or the east and certainly the decline in the western provinces was not absolute as there is still evidence of complex urban economic and social activity in Lincoln and York into the fourth century^{19,20}.

It has been suggested that one of the drivers for western urban decline and depopulation was the threat posed by barbarian invaders, particularly in continental Europe leading to a migration of the rich to Britain.

However the fiscal system may have had more of a hand in urban decline. The principal targets for taxation appear to have been the urban bourgeoisie, the curiales, particularly from the mid third century onwards²¹. The increasing tax burden, along with civic obligations (*munera*), on a declining urban population only serving to increase migration out of towns as a way of trying to avoid payment. That difficulties were experienced during the third century in raising money from urban dwellers may be implied by a number of legal rulings including the requirement of those compelled to hold public office should have financial sureties in place to the level of those who held office voluntarily in order to meet obligations. Another ruling allowed that bastards be eligible for the office of town councillor if there were insufficient men of legitimate birth²².

Tax payment in kind also increased during the third century, the decline in the purchasing power of the base silver coinage making extraction of goods more favourable than the coinage. The provisioning of the army in this way also served as a mechanism for reduction in the actual movement of coins themselves, thus the movements in the non

gold coinage perhaps being more a reflection of trade rather than state policy of monetary supply.

During the third century there was at least one monetary devaluation, that of Aurelian where, according to Zosimus, arrangements were made to buy in the old money and issue new to avoid confusion in financial dealings (Zos. I.61)²³. On top of this there was a visible debasement of the base silver coinage by the late 250's/early 260's, although the Gallic Empire coinage was not visibly affected until the debasement of 268AD. In such uncertain times monetary savings would probably have been less attractive than property and land. This may have led to the acquisition of land enabling agricultural production to survive on a subsistence level at least.

The agglomeration of large, almost self sufficient estates has been postulated, the so called latifundia, thus not needing to be associated with large scale monetary trade.

However work on rural occupation levels provides some conflicting evidence for the mass migration away from urban centres to rural locations. The assessment, based upon fairly crude interpretations of extent of habitation on a number of sites and the presence of dateable materials such as pottery and coins is admittedly fairly coarse in resolution, like the shipwreck evidence used by Hopkins, but it can be used to provide broad patterns²⁴. Whilst one must be careful in over-interpretation there is a seeming contraction of the western urban population there is also evidence for a significant drop in rural occupation levels 250-300 when compared to the period 100-200 and 200-250 in Belgica, Northern Gaul, Italy and Northern Spain²⁵. This is not matched in Britain,

Southern Spain nor, to a greater or lesser degree, in Southern Gaul but these areas do not increase in occupancy either in order to suggest an inward migration. This does not mean that it did not take place but the effects may be masked by a general decline in population numbers mooted due to a number of natural disasters like famine, plague and a series of earthquakes which hit the Mediterranean basin and other provinces between the 240's and 260's²⁶.

To conclude there appears to have been a continuation of movement during the latter half of the third century. This movement was principally of goods and/or people and thus is a potential mechanism for the movement of money. This movement, whilst accounting for a not inconsiderable amount of wealth when taken en masse, is probably not in the order of the amounts required for the thrice yearly army pay. Thus the individual monetary movements could practically have been made in base silver coin, the gold coinage circulating primarily as mechanism for state movements of wealth.

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CHAPTER 12 - CONCLUSIONS

The purpose of this work has been to demonstrate the economic functioning of the Gallic Empire, particularly in relation to its relationship with the Central Empire but also in terms of its internal economy and the period immediately after the capitulation of the separatist regime.

The examination of coin hoard evidence demonstrates that the concurrent base metal radiates produced by the Central Empire although initially excluded from Gallic hoards were later incorporated. The exclusion from hoards need not necessarily prohibit the co-existence of the Central Empire coinage within the Gallic realm, merely a preference to hoard the better silver of Postumus and the fact that Central Empire coins are not totally excluded from Gallic coin hoards of this initial period points to there being some available in the coin pool.

The mass incorporation of Central Empire coinage appears to be at a time when the Gallic base silver production was under pressure as there was a significant debasement at around the same time. This debasement put the Gallic and Central empire base metal issues on an approximate parity, removing the preference for Gallic coins. A brief examination of Italian coin finds has shown that this co-existence was not a two way thing and that there was much less of a chance of a Gallic coin being incorporated into a Central Empire hoard.

One may argue that by taking the date of deposition from the time of the latest official

base silver coins in the hoard that the terminal date may be biased unfairly towards an earlier date, particularly given the dearth of post Aurelianic reform coins hoarded in the west. One may however counter this when one considers the apparent date that the Central Empire coins are being hoarded in great numbers, a phenomena that occurs around 270 AD. This is well before the grouping of hoards with the apparent terminal date of 274. Thus the terminal coin issues of the pre 274 hoards probably fairly reflect the date of deposition.

The gold coinage appears to have been much more segregated and there is only secure evidence for circulation within the respective regimes. This is perhaps to be expected as the gold coinage assumed a role of ceremonial/commemorative issue as well as being a mechanism for the official bulk transfer of wealth. Its actual functioning as coin in regular transactions being somewhat removed, although there does seem to have been some attempt to maintain a notional relationship to the base silver coinage issues if one tracks the decline in weight of the gold coinage with that of the billon issues. In particular, there is the significant decline in weight of the gold aureus that is in evidence after the first issue of Victorinus, c.270.

The base silver laureate coinage (denarii?), whilst rarely encountered does tend to suggest a difference in the way they were used between the Gallic and Central Empire regimes. The Gallic laureates often share dies with the gold aurei and are not often encountered in radiate hoards. Conversely the Central Empire laureates utilise many reverse types but not, as far as I am aware, share reverse dies with the antoninianus issues and these are more frequently encountered in Gallic antoninianus hoards,

particularly the larger hoards. Thus, whilst the rarity of these coins tends to suggest that some at least were a special issue, the laureates of Gallienus retained a link to the antoniniani in terms of reverse design and circulation, whereas the Gallic ones were, perhaps, more ceremonial, showing a closer affinity to the gold coinage.

The period 268-70 seems to have been a turning point for the Gallic Empire. The decline in both gold and silver coin during the period, whilst not being directly coincident, is close in time. This occurred at a time when two, ultimately unsuccessful, attempts were made, by Laelianus and Marius, to seize the Gallic throne. It is also the time when the last vestiges of an unofficial bronze coinage were disappearing, hinting at significant inflation, or at least the removal of the necessity of a fractional bronze coinage in order to function economically using the remaining bronze fractions.

With regard to the local radiate production in the north western territories after the Gallic Empire this could well be linked to the removal of the western mint from Trier to Lyon after the "XXI" reform of Aurelian in 274. After this date the bulk of the wealth may have been moved into the northern provinces in gold, rather than base silver. with the purported inflationary pressures of the time this would have created an increasing demand on the base issues, requiring more and more for everyday transactions, a demand that was not being fed by useable fractional coinage.

This shortage of base silver coinage was possibly exacerbated by the decline in western exports to Italy in the face of North African competition, thereby removing a mechanism for additional radiates to infiltrate into the northern coin pool.

The mass of obviously false coins circulating must have had a further knock on in that adjacent areas may have been reluctant to accept the local radiates, further isolating the area from trade and reciprocal movements of coin.

One aspect of the Gallic Empire that the co-circulation of Gallic and Central Empire *antoniniani* has not allowed is the examination of the movement of the border between the two regimes. The combined hoarding of the coins in the Gallic territories from the two regimes after the debasement by Postumus around 268AD masks these changes there being no apparent political exclusion in the west at least. Here though the inscriptional evidence is able to provide some notion of the encroachment of the Central Empire's rule.

The inscriptions of both Gallienus and Postumus from the Iberian peninsular may be used to demonstrate that the support for Postumus' rule being perhaps incomplete in the province. In the south of France the inscriptions of Claudius II suggest that the Central emperors had a land corridor through to Spain from Italy.

The Gallic Empire was a period of separation of rule from the central Roman government but not necessarily economic isolation. One may blame the Gallic Empire for the final exclusion of Spanish wine, fish sauce and oil exports from Rome allowing the overall domination of African supplies but this is not the whole picture. The revolt may have interrupted supplies to governmental establishments from the Gallic territories, particularly the Iberian peninsular, but it is apparent that private trade continued. The mixing of the everyday money demonstrates that there must have been some economic

exchange, even if it was only one way, thus keeping Gallic coins substantially out of Italian hoards. Alternatively one may hypothesize a preferential return of Gallic currency encountered in trade for through fear of official sanction, the Gallic traders being less discriminatory in order to keep transactions going.

With regard to future work it would be a great advantage to find evidence as to the type of materials that were being traded in order to generate the movement of coinage at least in a unilateral direction. This will only be achieved if the transportation vessels can be identified and dated more closely. A modern analogy may be the tin can. Once the label has been removed, the contents may be only speculated upon and the date only approximated to ± 30 years. A further complication is added with the reuse of transportation vessels, so that where, say, amphorae are found is not necessarily their original destination, but this also adds to the lifetime of the vessel, rather than the use and dispose of culture we have today.

Secondly the local radiate issues will pay back further research, particularly with respect to the radiate hoards which seemingly terminate in 274 when looking at the official issues. Concentration upon identifiable prototypes and mint groups/die links would be the way forwards. In order for this to be practicable there must a greater emphasis on the publication of photographs of the coins with hoard and site find reports and the acceptance of an agreed methodology for the classification of these unofficial issues. Until that happens the identification of die links will rely largely on patience and luck.

In the introduction I quoted Clive Cheesman who was forced to admit that¹:

"(Gallic Empire coin hoards) taken en masse, they do impart a more or less consistent sum of information, but it is information that is hard to assess. For that situation to change, a reliable method of translating numismatic data into historical language would have to be developed - at present unlikely"

It is hoped that this study has gone some way to begin to unravel the complex economic interaction between the two regimes in the light of the coin hoards that are left behind. And whilst the nature and mechanism of the exchange between the two authorities is still unclear it is apparent that some exchange was taking place across the political divide and that there was no economic isolation of the Gallic Empire at least on a non governmental level.

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APPENDICES

APPENDIX 1 - CONCORDANCE OF THE EPIGRAPHIC SOURCES

Concordance of this study (plotted in figures 4.1-6) with König (1981), Drinkwater (1987) and other sources along with the imperial titles where recorded.

Bourne	König	Drinkwater	Other References	Titles
Gallienus 1	13	-	CIL II 2199	TRP, COS
Gallienus 2	14	-	CIL II 4691	TRP 3, COS 2
Gallienus 3	15	-	CIL XII 1352	
Gallienus 4	16	-	CIL XII 12	
Gallienus 5	17	-	CIL XII 57	
Gallienus 6	18	-	RIB 4042	
Gallienus 7	19	-	RIB 334	
Gallienus 8	20	-	RIB 1882	
Gallienus 9	21	-	CIL XIII 8911a	
Gallienus 10	22	-	CIL XIII 8912	
Gallienus 11	23	-	CIL XIII 8890	
Gallienus 12	24	-	CIL XIII 1644	
Gallienus 13	25	-	CIL III 5933	
Gallienus 14	26	-	CIL XIII 9111	
Gallienus 15	27	-	CIL XIII 9103	
Gallienus 16	28	-	CIL XIII 9091	
Gallienus 17	29	-	CIL XIII 9086	TRP, COS
Gallienus 18	30	-	CIL XIII 6780	Valerian COS 3, Gallienus COS 2
Gallienus 19	31	-	CIL XIII 8261	
Gallienus 20	32	-	CIL XII 149	
Gallienus 21	33	-	CIL XIII 5203	
Gallienus 22	-	-	AE (1993) 914	TRP 10, COS 3
Postumus 1	36	Postumus 18	CIL II 4919	TRP, COS 3
Postumus 2	37	Postumus 19	CIL II 4943	TRP, COS 3

Postumus 3	58	Postumus 17	CIL II 5736	Postumus COS 4, Victorinus COS
Postumus 4	59	Postumus 1	RIB 1883	
Postumus 5	60	Postumus 1	RIB 1886	
Postumus 6	57	Galic Consuls 1	RIB 1956	
Postumus 7	52	Postumus 2	JRS 55 (1965) p.224	
Postumus 8	61	Galic Consuls 2	RIB 605	
Postumus 9	39	Drinkwater dubious	JRS 50 (1960) p.238	TRP 5, COS
Postumus 10	51	Postumus 3	RIB 2260	
Postumus 11	50	Postumus 4	RIB 2255	
Postumus 12	49	Postumus 5	RIB 2232	
Postumus 13	54	Galic Consuls 5	Bjbb 135 (1930) p.25	
Postumus 14	55	Galic Consuls 4	CIL XIII 6779	
Postumus 15	56	Galic Consuls 3	CIL XIII 3163	
Postumus 16	34	Postumus 15	CIL XIII 9092	TRP, COS 2
Postumus 17	42	Postumus 7	Gallia 28 (1970) p.286	TRP 10, COS 5
Postumus 18	41	Postumus 16	Germania 21 (1937) p.29	TRP 9, COS 4
Postumus 19	62	Drinkwater dubious	CIL XIII 3035	
Postumus 20	43	Postumus 8	CIL XIII 8955	
Postumus 21	44	-	CIL XIII 8956	
Postumus 22	45	Postumus 8	CIL XIII 8957	
Postumus 23	35	Postumus 9	CIL XIII 9023	TRP, COS 2
Postumus 24	46	Postumus 10	CIL XIII 8972	TRP ?
Postumus 25	38	Postumus 11	Wuilleumier 465	TRP, COS 3
Postumus 26	47	Postumus 13	CIL XIII 8879	
Postumus 27	53	Postumus 12	CIL XIII 633	
Postumus 28	40	Postumus 14	CIL XIII 8883	TRP, COS 4

Postumus 29	48	Postumus 14	CIL XIII 8882	
Postumus 30	-	-	Germania (1993) p. 369, Historia (1997) p. 341	COS
Postumus 31	-	-	NC 1998 p.74, AE (1986) 423	
Postumus 32	-	-	AE (1986) 466	
Claudius 1	63	Drinkwater dubious	RIB 2246	
Claudius 2	72	Central Emps A	CIL XII 2228	TRP 2, COS
Claudius 3	73	Central Emps D	Espérandieu 651	TRP 3, COS 2
Claudius 4	74	Central Emps C (Claudius/Aurelian)	CIL XII 5511	TRP 3, COS 2
Claudius 5	71	Central Emps G (Aurelian)	Espérandieu 9	TRP, COS
Claudius 6	70	Central Emps L	CIL II 4505	TRP, COS 2
Claudius 7	67	Central Emps M	CIL II 3383	TRP, COS
Claudius 8	68	Central Emps M	CIL II 3834	TRP 3, COS 2
Claudius 9	69	Central Emps K	CIL II 4879	TRP, COS 2
Claudius 10	66	Central Emps N	CIL II 3737	TRP, COS
Claudius 11	64	Central Emps P	CIL II 1674	TRP 3, COS
Claudius 12	-	Central Emps J (Claudius/Quintillus)	Bellado p.597	
Claudius 13	-	Central Emps O	CIL II 3619	
Victorinus 1	93	Victorinus 1	RIB 2296	
Victorinus 2	92	Victorinus 2	RIB 2287	
Victorinus 3	89	Victorinus 3	RIB 2241	TRP
Victorinus 4	88	Victorinus 4	RIB 2238	TRP ?
Victorinus 5	91	Drinkwater dubious	RIB 2261	
Victorinus 6	90	Victorinus 5	RIB 2251	
Victorinus 7	76	Victorinus 7	CIL XIII 12090	TRP, COS
Victorinus 8	77	Victorinus 6	CIL XIII 11976	COS

Victorinus 9	75	-	CIL XIII 3679	
Victorinus 10	94	Drinkwater dubious	CIL XIII 11311	
Victorinus 11	79	Victorinus 8	CIL XIII 9040	TRP, COS
Victorinus 12	80	Victorinus 10	CIL XIII 8958	
Victorinus 13	81	Victorinus 10	CIL XIII 8959	
Victorinus 14	82	Victorinus 10	CIL XIII 8960	
Victorinus 15	83	Victorinus 10	CIL XIII 8961	
Victorinus 16	84	Drinkwater dubious	CIL XIII 8975	
Victorinus 17	85	-	CIL XIII 8999	
Victorinus 18	86	Victorinus 11	CIL XIII 9006	
Victorinus 19	87	Victorinus 9	CIL XIII 9012	TRP ?
Victorinus 20	78	Victorinus 13	AE (1979) 279	TRP
Victorinus 21	95	-	CIL XIII 12241	
Victorinus 22	96	-	CIL XIII 5868	
Victorinus 23	-	-	NC 1998, p. 75, n. 18 - Dubious, location uncertain in Tarraco	
Tetricus 1	107	Tetricus 1	RIB 1885	
Tetricus 2	104	Tetricus 2	RIB 2224	
Tetricus 3	105	Tetricus 2	RIB 2225	
Tetricus 4	106	Tetricus 2	RIB 2226	
Tetricus 5	113	Tetricus 3	JRS 52 (1962) p195	
Tetricus 6	109	Tetricus 4	CIL XIII 8977	
Tetricus 7	98	Tetricus 5	CIL XIII 8964	TRP, COS
Tetricus 8	99	Tetricus 5	CIL XIII 8963	TRP, COS
Tetricus 9	103	Tetricus 5	CIL XIII 8962	
Tetricus 10	111	Tetricus 5	CIL XIII 8970	
Tetricus 11	112	Tetricus 6	Annales de Bretagne 85 (1978) p. 349-60	
Tetricus 12	110	Tetricus 7	CIL XIII 9000	

Tetricus 13	115	Drinkwater dubious	CIL XIII 3035	
Tetricus 14	97	Tetricus 13	CIL XIII 9041	TRP
Tetricus 15	102	Tetricus 8	CIL XIII 8925	
Tetricus 16	100	Tetricus 9	CIL XIII 8927	TRP, COS
Tetricus 17	101	Tetricus 10	AE (1960) 175	TRP 2, COS
Tetricus 18	108	Tetricus 11	AE (1890) 154	TRP 2, COS ?
Tetricus 19	114	Tetricus 12	Espérandieu 656	Tetricus II COS
Aurelian 1	131	-	RIB 2309	
Aurelian 2	130	-	RIB 2227	
Aurelian 3	136	-	CIL XIII 9139	TRP, COS
Aurelian 4	135	-	CIL XIII 8997	TRP 6?, COS 3
Aurelian 5	134	-	CIL XIII 8973	TRP 7, COS 3
Aurelian 6	133	-	CIL XIII 8904	TRP 5, COS 3
Aurelian 7	132	-	CIL XIII 8868	TRP, COS 3
Aurelian 8	129	-	CIL XII 2673	TRP 5 COS 3
Aurelian 9	128	-	CIL XII 5561	
Aurelian 10	127	-	CIL XII 5549	TRP 6?, COS 3?
Aurelian 11	126	-	CIL XII 5553	
Aurelian 12	125	Central Emps E	CIL XII 5548	IMP 5, COS 3
Aurelian 13	124	Central Emps B	CIL XII 1551	
Aurelian 14	123	Central Emps F	CIL XII 5456	TRP 4, COS 3
Aurelian 15	122	-	Espérandieu 645	TRP 6, COS 3
Aurelian 16	121	Central Emps H	CIL XII 58	
Aurelian 17	120	-	CIL II 4506	TRP 3, COS 3, PROCOS 3
Aurelian 18	119	-	CIL II 4732	TRP ?
Aurelian 19	118	-	CIL II 2201	

Aurelian 20	-	-	AE (1986) 490	TRP ?
Aurelian 21	-	-	AE (1983) 696	TRP 5, COS 3
Aurelian 22	-	-	AE (1980) 640	COS ?
Aurelian 23	-	-	AE (1991) 944	TRP 6, COS 3

CIL VI 1641 (König 137), from Rome, names a man of equestrian rank as being a procurator of the mint at Trier and is probably of Gallic Empire date.

APPENDIX 2 - HOARD TABULATIONS

The tabulation of the hoard and site find information used in this study, particularly in relation to the graphs and statistics presented in Chapter 7 - The Analysis of Third Century Radiate Coin Finds, is listed here by reign. Where there are spaces in the data or question marks (?) there exists doubt about the data, either because it was not tabulated in the source consulted or there was insufficient information to classify it properly. Where a zero (0) occurs in the data tables this indicates that there were no coins of that particular issue in the deposit.

The total number of coins in the hoard and date of the last official coin in the hoard has been entered for use in calculation of the cusum totals, thus the information is nearly complete for British and French hoards but only partial for hoards from other areas. As noted in Chapter 7 only hoard data was used for the calculation of the cusum statistic, site find data being unsuitable for the purpose, however the site find information was used in the production of the issue graphs (figures 7.1-4, 7.32-7, 7.56-65 and 7.82-91).

The full bibliographic references of the data sources are presented in Appendix 3.

COUNTRY	HOARD	DATE OF LAST COIN	TOTAL No. OF COINS IN HOARD	REFERENCE	1	2	3	4	5	6	7	8
UK	ADDINGTON	271	170	CHRB II	1	1	1	1	2	6	11	3
UK	CADEBY	273	181	CHRB II	0	11	19	6	6	131	84	23
UK	IMALTRY	282	3498	CHRB II	1	19	26	7	180	136	136	54
UK	MUCH WENLOCK	284	2591	CHRB II	0	9	21	3	113	81	18	16
UK	SOMERSET	284	181	CHRB II	0	0	3	3	28	23	3	3
UK	BLACKMOOR	290	2236	CHRB III	3	68	72	41	288	613	2	82
UK	EAST MERSEA	273	657	CHRB IV	0	5	4	1	52	45	5	5
UK	MARKET DEEPING	273	2868	CHRB IV	0	9	11	1	99	48	3	22
UK	ALDBOURNE + ADDENDA	276	5074	CHRB IV+X	3	16	28	8	212	205	2	28
UK	TATTERSHALL THORPE	281	2897	CHRB V	0	23	41	6	173	107	0	24
UK	CHILD'S ERCALL	281	0	CHRB V	0	17	33	9	137	83	1	15
UK	COLERY	281	7167	CHRB V	1	47	70	8	458	309	0	48
UK	MONKTON FARLEIGH	286	3488	CHRB V	0	21	35	10	228	145	0	13
UK	OLIVER'S ORCHARD I	288	1598	CHRB VI	0	0	0	0	2	0	0	1
UK	OLIVER'S ORCHARD II	273	4071	CHRB VI	3	14	27	6	203	248	4	42
UK	OLIVER'S ORCHARD III	274	484	CHRB VI	0	6	7	1	37	28	1	19
UK	WICKHAM MARKET	273	1598	CHRB VI	0	16	19	4	125	108	3	43
UK	WESTMESTON	274	81	CHRB VI	0	1	1	0	2	4	0	2
UK	COMBE HILL	273	144	CHRB VI	0	6	2	0	6	5	0	2
UK	BATH AREA	286	1807	CHRB VI	0	1	21	1	123	80	0	5
UK	STEVENAGE	283	2578	CHRB VIII	0	5	0	0	0	0	0	1
UK	MINSTER	281	3235	CHRB VIII	0	16	15	1	124	102	2	13
UK	APPLESHAW	282	3052	CHRB VIII	2	12	30	2	150	122	0	8
UK	KIRKBY	282	304	CHRB VIII	1	0	4	2	13	12	1	3
UK	NORMANBY	280	4790	CHRB VIII	8	188	423	38	2804	1863	4	133
UK	BASSALEG	270	904	CHRB IX	0	0	0	0	4	3	1	2
UK	CAERLEON	270	51	CHRB IX	0	0	0	0	0	0	0	0
UK	WISHAW	274	156	CHRB IX	0	1	2	0	4	3	0	0
UK	NINESPRINGS VILLA	274	81	CHRB IX	0	1	1	1	10	3	0	1
UK	CHALGROVE	279	4145	CHRB IX	1	18	23	1	145	88	0	20
UK	CHALFONT	281	6882	CHRB IX	0	55	47	2	288	233	1	89
UK	LACOCK	288	89	CHRB IX	0	1	0	0	0	0	0	0
UK	FINESHADE	281	282	CHRB X	0	0	0	0	0	0	0	0
UK	CROWMARSH	287	387	CHRB X	0	1	1	0	0	0	0	0
UK	WORTLEY	270	81	CHRB X	0	0	0	0	0	0	0	0
UK	WAREHAM I	271	1569	CHRB X	0	3	1	0	9	5	0	9
UK	WAREHAM II	282	33	CHRB X	0	0	0	0	1	0	0	1
UK	BOTLEY	274	1394	CHRB X	0	7	8	0	48	43	0	15
UK	BOWCOMBE	277	472	CHRB X	0	2	2	1	22	21	1	5
UK	ASTHALL	287	25	CHRB X	0	0	0	1	1	0	0	0
UK	BLACKMOOR ADDENDA	286	124	CHRB X	0	0	4	0	4	0	0	0
UK	CUNETTO	274	54851	CUNETTO	54	1082	1304	145	5156	2737	232	1468
UK	RIEY	282	13468	BEIMFETTE BJ 42/ HST. ENZEL 23	1	49	133	18	636	557	2	139
UK	BEACHY HEAD 1873	273	9540	NC 1879	0	25	32	11	289	253	25	110
UK	BRIGHTON	274	928	NC 1877	0	2	4	0	67	38	0	2
UK	GARE	270	47	Ag/1084 to NC 1871	0	0	1	0	1	0	0	0
UK	ALCESTER	287	48	Ag/187 to NC 1869	0	0	0	0	0	0	0	0
UK	ERWYHEN	282	894	NC 1866	0	2	6	0	38	22	0	1
UK	DEEPING ST. JAMES	273	515	NC 1873	0	5	5	1	22	23	0	0
UK	DARFIELD III	2797	541	NC 1850	?	?	?	?	?	?	?	?
UK	ST. LEONARDS	340	129	NC 1851	0	0	0	0	0	0	0	0
UK	MYTHOLMOYD	274	597	NC 1853	0	7	6	3	15	19	0	5
UK	BEACHY HEAD 1981	280	3827	NC 1862	5	19	49	5	288	227	2	99
UK	HOLLINGBOURNE	282	5358	NC 1861	0	0	0	0	0	0	3	117
UK	AGDEN	282	2443	NC 1862	1	8	10	0	72	77	0	20
UK	MATTISHALL	281	1100	NC 1869	0	0	0	0	0	0	0	0
UK	MEARE HEATH	274	1404	COIN HOARDS II	0	0	11	2	28	16	0	2
UK	WOOCOTE OXON	283	77	OXONIENSIA 1954	0	0	0	0	0	0	0	0
UK	HACKENSHALL HALL FARM	273	339	LAJ 1 (1878)	0	4	3	1	7	8	0	1
UK	PIERCEBRIDGE	284	130	COIN HOARDS III	0	0	0	0	0	0	0	0
UK	ST. MARD I	278	5457	ST. MARD I	0	18	34	6	248	128	0	7

COUNTRY	HOARD	DATE OF LAST COIN	TOTAL No. OF COINS IN HOARD	REFERENCE	1	2	3	4	5	6	1	2-8	7-8
BELGIUM	WARLENCOURT	276	1935	RBN 1980	0	13	23	6	199	108	0	14	8
BELGIUM	TOURNAI 17	282	1938	TOURNAI	1	9	16	4	76	65	6	17	26
BELGIUM	TOURNAI 18	274	437	TOURNAI	0	3	0	2	20	21	1	5	6
FRANCE	THIAS	282	6011	BEIHEFTE BJ 42	0	40	61	11	330	232			
FRANCE	BAVAI	289	6666	BAVAI REPORT	0	77	150	35	1295	872	3	51	85
FRANCE	THIBOUVILLE (EURE)	296	3256	42/GALLIA 19	0	31	38	10	369	456	1	11	13
FRANCE	BISCHOFFSHEIM	274	6057	RN 1955	0	40	122	18	522	485	3	107	107
FRANCE	AUVILLIERS (LOIRET)	274	807	RN 1958	0	8	10	1	82	70	1	6	13
FRANCE	NOYERS (YONNE)	286	437	RN 1953	0	0	0	0	0	0	0	0	0
FRANCE	TREFFIEUX (LOIRE-ATLANTIQUE), Part 1	270	560	RN 1953	2	13	24	1	113	127	3	22	28
FRANCE	TREFFIEUX (LOIRE-ATLANTIQUE), PART 2	270	44	RN 1968	0	2	2	1	3	3	0	2	0
FRANCE	CHEZY-SUR-MARNE	274	604	RN 1958	0	3	10	1	18	10	0	2	1
FRANCE	ROUMROY part II	263	41	RN 1958	0	0	0	0	0	0	0	1	0
FRANCE	ALLONNES (SARTHE)	268	1016	RN 1962	0	0	0	0	2	0	1	2	0
FRANCE	SAINT-MESMIN (AUBE)	276	1233	RN 1962	0	1	0	0	4	0	0	0	0
FRANCE	VANNES (MORBIHAN)	262	570	RN 1963	0	0	0	0	0	0	0	0	0
FRANCE	CHATENAY-SUR-SEINE (SEINE-ET-MARNE)	262	701	RN 1963	0	1	1	0	0	0	0	0	0
FRANCE	ETAPLES (PAS DE CALAIS)	269	3781	RN 1965	3	4	1	1	13	1	0	3	1
FRANCE	FORGES-LES-BAINS (ESSONNE)	274	1109	RN 1967	0	3	11	3	57	37	0	6	8
FRANCE	MONTEREAU (SEINE ET MARNE)	264	339	RN 1972	0	1	0	1	62	40	1	4	4
FRANCE	CHILLEURS-AU-BOIS (LOIRET)	270	128	RN 1972	0	3	0	0	5	5	0	2	0
FRANCE	LAVILLIEUX (ARDECHE)	275	266	RN 1973	0	2	2	4	41	33	1	10	3
FRANCE	EALZE (MID-PYRENEES)	281	28003	TRESOR D'EALZE	2	1	0	0	0	0	9	5	0
FRANCE	MORGAT-EN-CROIZON (FINISTERE)	276	1545	TM 2	1	28	28	5	140	103	2	28	34
FRANCE	MARAVELLE (VARS)	295	1746	TM 5	0	2	0	0	2	0	0	1	1
FRANCE	AMIENS (SOMME)	276	235	TM 5	0	0	0	0	5	0	0	0	0
FRANCE	AUTHIEUX II	284	1081	TM 11	0	18	38	1	184	168	0	18	10
FRANCE	LES CLOSIERS (LOIRET)	274	365	TM 13	0	3	4	5	34	22	1	15	19
FRANCE	COURCOTE (MAYENNE)	270	3258	TM 11	1	27	7	2	27	7	2	11	1
FRANCE	BREZINS (ISERE)	270	1818	TM 16	1	6	8	1	68	367	5	100	123
FRANCE	SAINTE-MARIE-DE-GOURDANS (AIN)	264	1272	TM 16	0	17	17	2	78	78	0	23	17
FRANCE	BONNEUIL-SUR-MARNE	270	1769	RN 1968	1	59	37	4	268	211	1	55	57
FRANCE	IMALCORNE	270	1050	RN 1968	0	14	16	1	118	91	0	38	50
FRANCE	BOURG-BLANC (FINISTERE)	276	154	RN 1966	0	3	4	3	17	6	2	3	0
FRANCE	MONTBOUY	306	3310	GALLIA 12 Suppl.	0	10	13	0	98	116	0	18	6
FRANCE	FRESNOY-LE-ROYE II (SOMME)	309	469	ROMAIN 12	0	0	1	1	15	20	0	3	1
FRANCE	VAUCHON-VILLIERS (AUBE)	282	65	BSEF 43	0	0	0	0	0	0	1	0	0
FRANCE	TROYES (AUBE)	278	34	BSEF 44	0	0	0	0	0	0	0	0	0
FRANCE	VILLIERS-SAINT-BENOIT	274	27	BSEF 40	0	1	0	0	0	0	0	0	0
FRANCE	MOSSAGES (CANTAL) drees to 2747	270	16	BSEF 42	0	0	0	0	4	2	0	1	0
FRANCE	SALTY (PAS-DE-CALAIS)	266	35	BSEF 38	0	0	0	0	0	0	0	0	0
FRANCE	OISY (NIEVRE)	262	44	BSEF 43	0	0	0	0	0	0	0	0	0
NETHERLANDS	VUGHT	274	4778	523 16656	0	32	40	12	288	239	0	47	98
LUXEMBOURG	TEITELBERG	274	57	FMRL II 201	0	0	0	0	4	0	0	1	0
LUXEMBOURG	BLUMENTHAL	282	43	FMRL II 31	0	0	0	0	2	3	0	2	3
AUSTRIA	BALDERSDORF	278	1214	BEIHEFTE BJ 42	0	23	31	17	159	132	0	15	12
GERMANY	BRAUNWEILER	274	2823	BEIHEFTE BJ 42	0	16	26	2	111	88	0	40	47
GERMANY	KATTENES	274	1093	BEIHEFTE BJ 42	0	65	40	11	270	210	0	15	12
GERMANY	NIEDER-RENTGEN	286	1622	BEIHEFTE BJ 42	0	109	172	37	1304	857	0	40	47
GERMANY	REGENSBURG	268	40	FMRO 13 3028	0	0	0	0	6	7	0	0	0
GERMANY	FORCHHEIM	274	285	FMRO 14 4017	0	24	21	5	29	30	0	18	23
GERMANY	SCHWARZENACKER (FMRO III 1023)	262	4811	FMRO III 1023	0	0	1	0	0	0	0	0	0
GERMANY	ORSCHALZ	270	2842	FMRO III 1044	0	10	17	3	48	43	0	1	9
GERMANY	HUTTERSODORF	274	727	FMRO III 1134	0	1	0	0	8	4	0	2	0
GERMANY	ALZEY	268	382	FMRO IV 1005	0	2	1	1	13	5	1	4	2
GERMANY	BINGEN	274	1500	FMRO IV 1092	0	0	0	0	0	0	0	1	0
GERMANY	MAINZ II	265	1872	FMRO IV 1164	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ III	274	100	FMRO IV 1165	0	0	1	1	1	1	0	0	0
GERMANY	BRETZENHEIM	320	30	FMRO IV 1179	0	0	0	0	1	10	0	0	0

COUNTRY	HOARD	DATE OF LAST COIN	TOTAL NO. OF COINS IN HOARD	REFERENCE	1	2	3	4	5	6	1	2-6	7-8
GERMANY	MAINZ	274	52	FNIRD IV.1.1196	0	1	1	0	2	3	0	0	0
GERMANY	MAINZ III (check name)	353	115	FNIRD IV.1.1201	0	2	2	0	13	11	0	2	0
GERMANY	BATTENBERG	274	118	FNIRD IV.2.2022	0	0	0	0	0	0	0	0	0
GERMANY	LEINERSHEIM	261	282	FNIRD IV.2.2068	0	0	0	0	0	0	2	0	0
GERMANY	SPESBACH	281	42	FNIRD IV.2.2102	0	0	0	0	0	0	0	0	0
GERMANY	NEUHOFEN	257	353	FNIRD IV.2.2219	0	0	0	0	0	0	0	0	0
GERMANY	FEILBINGERT	274	102	FNIRD IV.2.2266	0	0	0	0	8	10	0	0	1
GERMANY	GEVELSBERG	353	65	FNIRD V.5.5025	0	1	1	0	7	11	0	2	0
GERMANY	NIHEIM	337	9	FNIRD V.8.6070	0	0	0	0	0	0	0	0	0
GERMANY	PADERBORN	375	71	FNIRD V.8.6118	0	0	0	0	1	0	0	1	0
GERMANY	BALTZEN	270	5	FNIRD IX.1004	0	0	0	0	0	0	0	0	1
GERMANY	SORNEWITZ	270	9	FNIRD IX.1043	1	0	0	0	1	2	0	0	0
GERMANY	DRESDEN-STREISEN	348	14	FNIRD IX.1063	0	0	0	0	2	0	0	0	0
GERMANY	MAINZ - Kastrieh	274	423	JAHRBUCH 1988	0	0	0	0	0	1	0	0	0
SPAIN/PORTUGAL	GIBRALTAR	268	29850	1962	0	1133	1136	953	14487	192			
SPAIN/PORTUGAL	VILA PAIZ (PORTUGALIA III/II)	274	54	1962/3	0	0	1	1	15	6	0	0	0
SPAIN/PORTUGAL	CAVALEIRO	281	67	XX-XXII	0	2	1	0	18	11	0	0	0
SPAIN/PORTUGAL	ALTAFLUA	266	230	NUMISMA 27	0	2	0	1	1	0	3	2	0
SPAIN/PORTUGAL	LISBON	274	84	COIN HOARDS VI	0	0	1	0	42	2	0	0	1
SPAIN/PORTUGAL	TARRAGONA	266	105	NUMISMA 27	0	0	0	0	3	0	0	0	0
SPAIN/PORTUGAL	REUS	270	109	NUMISMA 27	0	0	3	0	45	22	0	1	0
SPAIN/PORTUGAL	LES ALQUERIES	267	122	NC 1988	1	9	0	2	0	0	0	0	0
ITALY	LA VENERA			ROMAINE 4									
TURKEY	CANAKKALE	284	3044	ROMAINE 4	0	9	20	3	187	695	0	1	0
	TOTALS		409658		99	3710	4748	1523	34294	15411	350	3430	2583

COUNTRY	HOARD	DATE OF LAST CON	TOTAL No. OF COINS IN HOARD	REFERENCE	CLAUDIUS ROME				CLAUDIUS MELAN			CUNY	DIVO CL.		AURELIAN		TOTAL	
					1	2	3	4	1	2	3		ROME	MELAN	ROME (XXI)	LYON (XXI)		ROME (XXI)
GERMANY	WALDORF	375	71	FMRD IX 6118	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BAUTZEN	270	5	FMRD IX 1004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	SORNEWITZ	270	9	FMRD IX 1043	0	1	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	DRESDEN-STREISEN	348	14	FMRD IX 1088	0	1	0	0	1	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ - Kastlich	274	423	JAHREBUCH 1888	0	7	3	1	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	GIBRALTAR	288	28650	1892	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	VILA PAIZ (PORTUGALIA I/II)	274	54	1882/3	0	13	4	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	CAVALEIRO	281	87	XX-XXII	0	14	8	7	0	0	3	2	4	0	0	0	0	0
SPAIN/PORTUGAL	TAFULJA	288	293	NUMISMA 27	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	LISBON	274	84	COIN HOARDS VII	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	TARRAGONA	288	108	NUMISMA 27	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	REUS	270	109	NUMISMA 27	0	10	6	1	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	LES ALJERIES	287	122	NC 1868	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ITALY	LA VENERA	284	3044	ROMAINE 4	0	859	234	88	133	159	43	12	62	2	0	12	13	9
TURKEY	CANAKKALE	284	3044	ROMAINE 4	0	26	66	14	26	66	14	103	14	103	12	0	12	13
TOTALS			40868		5	1360	4517	2311	1688	1471	283	2020	218	2489	6	259	107	541

POSTUMUS		MINT 1		MINT 2										
COUNTRY	HOARD	DATE LAST COIN	HOARD/SITE	No. IN HOARD	ISSUE 1	TRIER	2	3	4	5	6	7	COLOGNE	MILAN
UK	CUNETIO	274 H	274 H	54591	8104		1783	2928	616	571	944	288	1	2
UK	NORMANBY (CHRB VIII)	289 H	289 H	47909	10		3	13	6	14	253	73	33	0
UK	STEVENAGE (CHRB VIII)	263 H	263 H	2579	503		53	8	0	0	0	0	0	0
UK	MINSTER (CHRB VIII)	281 H	281 H	3235	4		0	2	0	3	15	1	2	0
UK	APPLESHAW (CHRB VIII)	282 H	282 H	3052	2		0	1	0	0	17	3	3	0
UK	KIRKBY (CHRB VIII)	282 H	282 H	304	0		0	1	0	0	2	1	1	0
UK	ADDINGTON (CHRB II)	270 H	270 H	170	13		1	24	3	1	5	0	0	0
UK	VINTNER'S PARK (CHRB II)	272 H	272 H	38	2		0	1	0	0	0	0	1	0
UK	CADEBY (CHRB II)	274 H	274 H	1851	6		0	5	1	10	17	5	5	0
UK	MALTYB (CHRB II)	282 H	282 H	3486	40		14	58	45	21	50	17	5	6
UK	MUCH WENLOCK (CHRB II)	284 H	284 H	2591	5		1	8	3	3	22	9	1	0
UK	PURBROOK HEATH (CHRB IV)	272 H	272 H	207	36		10	31	25	14	6	0	3	0
UK	EAST MERSEA (CHRB IV)	273 H	273 H	657	4		0	3	0	0	3	2	0	0
UK	MARKET DEEPING (CHRB IV)	273 H	273 H	2888	287		67	200	119	74	86	41	18	0
UK	DEEPING ST. JAMES (NC 1973)	273 H	273 H	615	11		3	14	2	0	2	0	2	0
UK	ALDOURNE (CHRB IV)	274 H	274 H	4780	44		17	44	35	27	39	15	7	1
UK	TATERSHALL THORPE (CHRB IV)	281 H	281 H	5074	2		0	6	3	4	25	12	3	0
UK	LANCASTER (ROMAN FORT & TOWN OF L...)		SITE				0	3	0	0	0	0	0	0
UK	ERW-REN (NC 1966)	292 H	292 H	654	2		0	4	3	0	3	1	0	0
UK	PRESALL HILL (COIN HOARDS VII)	274 H	274 H	11	1		0	1	0	0	0	0	0	0
UK	RIBY (HISTORIA EINZELSCRIFTEN 23)	282 H	282 H	13495	5		9	18	4	8	77	35	12	1
UK	LIGHTWOOD (N STAFFS J)	280 H	280 H	2451	2		0	6	1	2	10	0	0	0
UK	BEACHY HEAD 1973 (NC 1979)	273 H	273 H	5540	17		5	16	4	11	25	4	2	1
UK	BEACHY HEAD 1981 (NC 1982)	280 H	280 H	3927	4		0	16	10	9	20	6	6	0
UK	BEACHY HEAD 1984 (CUNETIO)	288 H	288 H	3173	313		255	658	253	64	0	0	0	0
UK	PIERCEBRIDGE (COIN HOARDS III)	284 H	284 H	130	28		2	3	1	0	0	0	0	0
UK	WALBOTTLE (ARCH. AEL 1931)	274 H	274 H	878	33		4	22	8	8	22	5	7	0
UK	MILDENHALL (NC 1954)	274 H	274 H	1285	0		0	4	1	6	3	1	0	1
UK	SUTTON BONNINGTON (NC 1935)	274 H	274 H	25	0		0	0	0	0	0	0	0	0
UK	GREAT CHESSELS (NC 1960)	274 H	274 H	134	0		1	0	0	0	0	0	0	0
UK	MATTISHALL (NC 1969)	281 H	281 H	1100	3		0	0	0	0	0	0	0	0
UK	WELWYN (NC 1959)	271 H	271 H	149	18		2	9	6	3	9	2	1	0
UK	CHOSELEY III (CUNETIO)	270 H	270 H	405	38		29	94	34	20	24	6	6	1
UK	BOOTHSTOWN (NC 1947)	274 H	274 H	540	26		12	24	8	9	5	1	1	0
UK	EMNETH (NC 1945)	274 H	274 H	1984	28		14	48	21	35	13	3	0	0
UK	LNWOOD (CUNETIO)	274 H	274 H	176	21		11	30	13	17	16	4	2	0
UK	POOLE (CUNETIO)	274 H	274 H	965	21		2	20	27	11	5	2	1	0
UK	HOLLINGBOURNE (NC 1951)	274 H	274 H	5355	240		145	375	277	81	114	19	20	3
UK	BASSALEG (CHRB IX)	270 H	270 H	904	188		75	143	48	11	2	3	1	0
UK	CAERLEON (CHRB IX)	270 H	270 H	51	6		1	7	4	7	1	1	0	0
UK	WISHAW (CHRB IX)	273 H	273 H	158	5		0	2	1	2	2	0	1	0
UK	CHALGROVE (CHRB IX)	278 H	278 H	4145	1		1	0	1	3	18	9	2	0
UK	CHALFONT (CHRB IX)	281 H	281 H	6682	23		10	41	39	33	67	24	8	0
UK	GARE (NC 1971)	270 H	270 H	1084	3		4	1	5	1	2	0	1	0
UK	ALCESTER (NC 1969)	267 H	267 H	87	14		11	15	6	0	0	0	0	0
UK	HACKENSALL HALL FARM (LA11)	273 H	273 H	339	0		0	0	0	0	0	2	0	0
UK	MIDDLEHAM (?) YORKSHIRE (NC 1962)	274 H	274 H	32	0		0	0	0	0	0	0	0	0
UK	UPTON (NC 1929)	274 H	274 H	303	0		1	0	0	0	1	0	0	1
UK	BARTON (MISS DARLINGTON MUSEUM)	280 H	280 H	189	0		0	0	0	0	1	0	0	0
UK	BROUGHAM (TRANS. CUMB & WEST 76)	274 H	274 H	23	0		0	4	1	0	0	0	0	0
UK	LLANDEYRN I (BULL. BOARD CELT. STUD 27)	274 H	274 H	1084	50		8	25	8	0	0	0	0	0
UK	SEGONTIUM I (ARCH. CAMB. 125)	274 H	274 H	56	0		0	1	1	0	0	0	0	0
UK	SEGONTIUM III (ARCH. CAMB. 125)	274 H	274 H	12	0		1	0	0	0	0	0	0	0
UK	SEGONTIUM GENERAL (ARCH. CAMB. 125)		SITE				0	0	0	1	0	0	0	0
UK	WATERINGBEY (COIN HOARDS 4)	288 H	288 H	10	1		0	4	2	1	0	0	0	0
UK	FLAGGRASS I (COIN HOARDS IV)	285 H	285 H	78	1		0	1	0	0	0	0	0	0

POSTUMUS		DATE LAST COIN		HOARD/SITE		No. IN HOARD		MINT 1 TRIER		MINT 2 COLOGNE	
COUNTRY	HOARD	DATE LAST COIN	HOARD/SITE	No. IN HOARD	ISSUE 1	2	3	4	6	8	7
UK	FLAGGRASS III (COIN HOARDS IV)	270 H		15	1	0	2	4	6	8	7
UK	STONEA CAMP WIMBLINGTON (COIN HOARDS IV)	273 H		25	0	0	2	1	1	0	0
UK	OLIVER'S ORCHARD I, II, III (CHRB VI)	274 H		6123	310	194	0	0	0	0	0
UK	COMBE HILL (CHRB VI)	273 H		144	5	2	432	259	83	117	21
UK	WICKHAM MARKET (CHRB VI)	273 H		1588	48	14	33	27	20	40	0
UK	LOSTWITHIEL (CHRBV)	274 H		103	5	0	10	2	0	0	0
UK	BLACKMOOR (CHRB III)	266 H		22435	24	7	18	18	7	84	41
UK	CHILD'S ERCALL (CHRB V)	281 H		2887	3	0	3	2	1	12	4
UK	COLEBY (CHRB V)	281 H		7767	3	0	12	0	3	34	16
UK	MONKTON FARLEIGH (CHRB V)	285 H		3486	1	0	0	0	3	25	3
UK	FINESHADE (CHRB X)	283 H		282	16	0	0	0	0	0	0
UK	CROWMARSH (CHRB X)	287 H		337	45	9	4	2	0	0	0
UK	WORTLEY (CHRB X)	270 H		81	7	1	0	1	2	0	0
UK	WAREHAM (CHRB X)	271 H		1569	122	110	331	204	86	54	8
UK	BOTLEY (CHRB X)	274 H		1364	31	18	38	19	13	38	7
UK	BOWCOMBE (CHRB X)	277 H		472	10	3	7	12	5	3	2
UK	KNARESBOROUGH (CHRB X)	282 H		283	0	0	0	0	0	11	3
UK	BLACKMOOR ADDENDA (CHRB X)	285 H		124	0	3	0	0	2	5	2
UK	CAMERTON, BATH (NC 1851)		SITE		0	0	0	1	0	0	0
UK	CAMERTON, BATH II (NC 1853)		SITE		1	0	0	0	0	0	0
UK	MYTHOLMROYD (NC 1963)	274 H		587	21	4	9	6	7	3	3
UK	CAMERTON, BATH III (NC 1855)		SITE		0	0	0	0	0	0	0
UK	HOLLINGBOURNE (NC 1861)	282 H		5353	240	146	375	227	81	97	12
UK	AGDEN (NC 1862)	282 H		2443	3	1	6	4	4	20	6
UK	MEARE HEATH (COINHOARDS II)	274 H		1404	3	1	2	1	4	3	1
UK	WOODCOTE (OXONIENSIA 1954)	283 H		77	10	3	4	0	0	0	0
UK	BATH AREA (CHRB VI)	274 H		1807	3	0	1	0	0	10	3
UK	NORTHUMBRIA	274 H		5024	85	23	80	31	25	82	18
UK	ENGLAND (BASTIEN FET)	274 H		888	1	0	0	0	0	5	0
BELGIUM	TOURNAI 17	282 H		1938	204	127	303	91	52	56	11
BELGIUM	TOURNAI 18	274 H		437	2	0	2	2	1	5	2
BELGIUM	WARLENCOURT (RB 1860)	278 H		1335	2	0	4	0	1	8	1
BELGIUM	BASECLES (CUNETIO)	283 H		480	118	82	70	0	0	0	0
BELGIUM	FAMARS (CUNETIO)	288 H		251	38	22	69	37	0	0	0
BELGIUM	GROTENBERGE (RB 1951)	288 H		2410	230	144	380	928	178	0	0
BELGIUM	HOWARDRIES (R BELGE 1960)	263 H		242	41	41	88	0	0	0	0
BELGIUM	ST. MARD (ST. MARD I, 1970)	276 H		5457	0	0	0	0	0	3	0
FRANCE	D'EAUZE	261 H		28003	846	0	0	0	0	0	0
FRANCE	MORGAT-EN-CROZON (TM II)	276 H		1545	93	44	134	57	38	27	2
FRANCE	MELLE (ACTA NUMISMATICA VII)	274 H		850	6	1	6	2	2	4	2
FRANCE	CLERMONT (CUNETIO)	261 H		600	107	0	0	0	0	0	0
FRANCE	VANNES (RN 1963)	282 H		570	12	4	0	0	0	0	0
FRANCE	NOYERS (RN 1963)	288 H		437	17	53	39	0	0	0	0
FRANCE	ROUVROY (RN 1954)	283 H		642	78	55	60	0	0	0	0
FRANCE	ROUVROY II (RN 1954)	283 H		41	4	3	4	0	0	0	0
FRANCE	CHREZY-SUR-MARNE (RN 1958)	274 H		804	2	0	0	1	1	0	0
FRANCE	CHATENAY (RN 1963)	283 H		701	70	42	120	0	0	0	0
FRANCE	ALLONNES (SARTHE) (RN 1962)	268 H		1016	58	60	143	22	1	0	0
FRANCE	ETAPLES (RN 1966)	268 H		3791	314	308	1001	678	33	0	0
FRANCE	HARNES (CUNETIO)	288 H		156	9	14	35	15	2	0	0
FRANCE	BONNEUIL (RN 1966)	270 H		1759	89	36	93	65	38	102	18
FRANCE	CHILLEURS (RN 1972)	270 H		129	18	11	22	4	6	3	0
FRANCE	DOUVRES (RB 1958)	271 H		7856	431	340	846	571	323	505	56
FRANCE	MALCORNE (RN 1966)	270 H		1050	65	39	125	45	18	18	2
FRANCE	TOTES (RB 1968)	270 H		1379	61	54	97	39	23	38	4
FRANCE	TREFFIEUX (RN 1863+1968)	270 H		584	38	15	31	26	15	40	0

POSTUMUS	HOARD	DATE LAST COIN	HOARD/SITE	No. IN HOARD	MINT 1 TRIER	MINT 2 COLOGNE	1	2	3	4	5	6	7	8	MILAN
FRANCE	COESMES (RB 1958)	275 H	H	1304	ISSUE 1		29	12	0	6	23	32	0	0	0
FRANCE	EVREUX (CUNETIO)	280 H	H	7373	1560	1422	188	101	94	10	900	1446	238	7	?
FRANCE	BOIS DE FAT (RB 1958)	?	H	?	177		188	101	94	10	900	1446	238	7	?
FRANCE	BAVAI (BEHEFE BT 42 BAVA I REPORT)	289 H	H	6658	77		188	101	94	10	900	1446	238	7	?
FRANCE	LES CLOSERS (TM XIII)	274 H	H	83	21		188	101	94	10	900	1446	238	7	?
FRANCE	LUZARCHES (TM XIV)	348 H	H	85	0		188	101	94	10	900	1446	238	7	?
FRANCE	GUIRY-EN-VEIXIN (TM XII)	281 H	H	608	153		188	101	94	10	900	1446	238	7	?
FRANCE	COUPVRAV (TM XV)	271 H	H	217	5		188	101	94	10	900	1446	238	7	?
FRANCE	GRAVENT (TM XV)	268 H	H	4401	708	422	101	94	10	12	10	2	3	0	4
FRANCE	LMOURS (TM XV)	270 H	H	510	43		101	94	10	12	10	2	3	0	4
FRANCE	SOUZY-LA-BRICHE (TM XV)	287 H	H	5448	19	31	62	16	0	0	0	0	0	0	0
FRANCE	LES ORMES (TM XIV)	274 H	H	185	1		185	1	3	1	1	0	0	0	4
FRANCE	CHAMPALLON (TM XIV)	275 H	H	102	0		102	0	0	0	0	0	0	0	2
FRANCE	SAINTE PALLAYE (TM XIV)	283 H	H	8884	4		8884	4	0	0	0	0	0	0	0
FRANCE	COURCITE (TM XI)	270 H	H	1081	822	568	819	95	6	6	6	6	1	0	0
FRANCE	LAVILLEDU (ARDECHE) (RN 1973)	275 H	H	288	1		288	1	0	0	0	0	0	0	2
FRANCE	CHATEAUNEUF-DE-MAZENC (DROME) (RN 1954)	270 H	H	142	1		142	1	0	0	0	0	0	0	1
FRANCE	FORGES-LES-BAINS (ESSONNE) RN 1967	274 H	H	1109	1		1109	1	1	1	2	1	0	0	1
FRANCE	AUVILLERS (LOIRET) RN 1956	274 H	H	907	4		907	4	3	2	2	6	3	1	0
FRANCE	AMIENS (SOMME) TM 5	276 H	H	235	0		235	0	0	0	0	0	0	0	2
FRANCE	MONTEREAU (SEINE ET MARNE) RN 1972	294 H	H	339	0		339	0	1	0	0	0	0	0	0
FRANCE	THIBOUVILLE (EURE) GALIA 19	298 H	H	3256	2		3256	2	0	0	1	0	0	0	3
FRANCE	BREZINS (ISERE) TM 18	270 H	H	1918	6		1918	6	30	16	28	11	4	0	93
FRANCE	SAINT-AURICE-DE-GOURDANS (AIN) TM 16	284 H	H	1272	3		1272	3	2	1	1	5	0	1	4
FRANCE	VAUCHON-VILLIERS (AUBE) BSFN 43	262 H	H	65	1		65	1	0	0	0	0	0	0	0
FRANCE	SAINTE FLORENT (PUY-DE-DOME) BSFN 44	278 H	H	7	1		7	1	1	1	0	1	0	0	0
FRANCE	MOUSSAGES (CANTAL) BSFN 42	270 H	H	18	0		18	0	0	1	0	0	0	0	0
FRANCE	SAULTY (PAS-DE-CALAIS) BSFN 38	266 H	H	367	7		367	7	5	2	1	0	0	0	0
FRANCE	OISY (NIEVRE) BSFN 43	262 H	H	44	1		44	1	11	0	0	0	0	0	0
FRANCE	BISCHOFFSTEIM (RN 1965)	274 H	H	8067	20		8067	20	14	21	38	8	13	4	61
FRANCE	BOURG-BLANC (RN 1966)	274 H	H	154	5		154	5	7	8	3	3	3	0	1
FRANCE	VOUGHT (N MUNT D'PENNINGKUNDE 52/3)	274 H	H	4778	21		4778	21	22	24	15	14	2	5	16
NETHERLANDS	AARDENBURG A (ROB 17)	274 H	H	146	1		146	1	0	0	0	0	0	0	0
LUXEMBOURG	CONTERN (FMRL 72)	SITE	SITE		5		5	3	12	0	0	5	0	0	0
LUXEMBOURG	ALTRIER (FMRL 6)	SITE	SITE		1		1	1	1	0	1	2	0	0	0
LUXEMBOURG	BOURScheid (FMRL 52)	SITE	SITE		0		0	0	1	0	0	0	0	0	0
LUXEMBOURG	BURMERANGE (FMRL 57)	H	H		0		0	0	0	0	0	0	0	0	0
LUXEMBOURG	DALHEIMRICCIACUS (FMRL 82)	SITE	SITE		9		9	4	4	4	4	6	2	0	0
LUXEMBOURG	ETTERNACH (FMRL 106)	SITE	SITE		0		0	0	0	0	0	0	0	0	0
LUXEMBOURG	ETTLEBRUCK (FMRL 123/4)	?	?		56		56	74	185	0	0	1	0	0	0
LUXEMBOURG	GRAND DUCHY MUSEUM (FMRL 143)	H	H		3		3	1	12	1	0	0	2	0	0
LUXEMBOURG	HELLANGE (FMRL 166)	H	H		0		0	0	1	0	0	0	0	0	0
LUXEMBOURG	KAHLER (FMRL 190)	H	H		0		0	0	1	1	0	0	0	0	0
LUXEMBOURG	KLEINBETTINGEN (FMRL 195)	SITE	SITE		13		13	5	18	3	15	0	0	0	0
LUXEMBOURG	LINTGEN (FMRL 205)	H	H		2		2	0	6	5	1	2	0	0	0
LUXEMBOURG	DINSELT (FMRL 210)	SITE	SITE		0		0	0	1	0	0	0	0	0	0
LUXEMBOURG	MEDERNACH (FMRL 233)	SITE	SITE		5		5	0	13	0	0	0	0	0	0
LUXEMBOURG	NOSPELT (FMRL 269)	SITE	SITE		1		1	0	0	0	0	0	0	0	0
LUXEMBOURG	REICHLANGE (FMRL 286)	SITE	SITE		1		1	1	568	0	0	0	0	0	0
LUXEMBOURG	REMICHT (FMRL 292-6)	SITE	SITE		2		2	1	2	0	0	0	0	0	0
LUXEMBOURG	STEINFORT (FMRL 332)	SITE	SITE		1		1	0	0	0	0	0	0	0	0
LUXEMBOURG	STEINSEL (FMRL 335)	SITE	SITE		0		0	0	1	0	0	0	0	0	0
LUXEMBOURG	TETTELBERG (FMRL 343-61)	SITE	SITE		6		6	0	4	1	3	5	0	0	1
LUXEMBOURG	WIDDERBIERG (MENSENDORF) (FMRL 369)	SITE	SITE		2		2	0	0	0	0	1	0	0	0

POSTUMUS	HOARD	DATE LAST COM	HOARD/ SITE	No. IN HOARD	ISSUE 1	2	3	4	5	6	7	MINT 1 TRIER	MINT 2 COLOGNE	MILAN
COUNTRY	HOARD	DATE	HOARD/ SITE	No. IN HOARD	ISSUE 1	2	3	4	5	6	7	MINT 1 TRIER	MINT 2 COLOGNE	MILAN
LUXEMBOURG	BLUMENTHAL (1948) (FMRL II 31)		H	43	0	0	1	0	0	4	1		1	2
LUXEMBOURG	TETELBERG (1955) (FMRL II 200)		H	8	0	0	3	0	1	0	0		0	0
AUSTRIA	VINDONISSA		SITE		0	1	2	2	0	0	0		0	0
GERMANY	LEIMERSHEIM (FMRD IV 2 2068)	281 H	H	282	14	1	0	0	0	0	0		0	0
GERMANY	SCHWARZENACKER (FMRD II 1023)	282 H	H	4811	19	7	0	0	0	0	0		0	0
GERMANY	ORSCHALZ (FMRD III 1044)	270 H	H	2842	0	9	8	0	3	23	12		0	0
GERMANY	TRIER (FMRD IV 3 3001)		SITE		3	4	1	1	1	1	0		0	13
GERMANY	KOLN (FMRD VI 1 1001)		SITE		2	1	2	0	3	0	0		0	0
GERMANY	KOLN (FMRD VI 1 1002)		SITE		1	0	1	0	0	0	0		0	0
GERMANY	KOLN (FMRD VI 1 1007)		SITE		1	1	0	0	0	0	0		0	0
GERMANY	KOLN (FMRD VI 1 1008)		SITE		1	1	2	0	0	0	0		0	0
GERMANY	KOLN (FMRD VI 1 1009)		SITE		3	1	1	1	1	1	1		0	0
GERMANY	KOLN (FMRD VI 1 1010)		SITE		0	1	0	0	0	0	0		2	0
GERMANY	KOLN (FMRD VI 1 1012)		SITE		0	1	0	0	0	0	0		0	1
GERMANY	BUTZBACH (FMRD V 2 2109)		SITE		0	0	0	0	0	7	0		0	0
GERMANY	FREIBURG (FMRD V 2 2120)		SITE		1	1	0	0	0	0	0		0	0
GERMANY	GIESSEN (FMRD V 2 2141)		SITE		0	0	0	0	1	0	0		0	0
GERMANY	GROSS-GERAU (FMRD V 2 2210)		SITE		1	0	0	1	0	0	0		0	0
GERMANY	WALLERSTÄDTTEN (FMRD V 2 2228)		SITE		2	2	0	0	0	0	0		0	0
GERMANY	VILLA DBI PRAUNHEIM, NIDA (FMRD V 2 2269)		SITE		0	0	0	0	0	0	0		0	0
GERMANY	UNTERLAHNKREIS (FMRD IV 5 5018)		SITE		2	2	0	0	0	1	0		0	0
GERMANY	LORENZBERG (FMRD I 1 252)		SITE		2	0	0	0	1	0	0		0	0
GERMANY	SEEBRUCK (FMRD I 1 301)		SITE		0	1	0	0	0	0	0		0	0
GERMANY	MOOSBERG (FMRD I 1 326)		SITE		0	0	0	0	0	0	0		1	0
GERMANY	STRANING (FMRD I 2 2108)		SITE		0	0	1	0	0	0	0		0	0
GERMANY	REGENSBURG (FMRD I 3 3064/8)		SITE		0	0	1	0	0	0	0		0	0
GERMANY	FORCHEIM (FMRD I 4 4017)	274 H	H	285	3	4	6	1	9	1	0		1	0
GERMANY	STOCKSTADT AM MAIN (FMRD I 8 8015)		SITE		0	0	1	0	0	0	0		0	0
GERMANY	MILTENBERG (FMRD I 6 8078)		SITE		0	0	1	0	0	0	0		0	0
GERMANY	BAD DRIBURG (FMRD VI 8 6033)		SITE		0	0	1	1	0	0	0		0	0
GERMANY	PADERBORN (FMRD VI 8 8119)		SITE		0	0	1	0	0	0	0		0	0
GERMANY	GROSS REKEN (FMRD VI 4 4019)		SITE		0	0	0	0	0	0	0		1	0
GERMANY	LÜRN (FMRD VI 5 5088)		SITE		0	0	1	0	0	0	0		0	0
GERMANY	PFORZHEIM (FMRD II 1 1180)		SITE		1	0	0	0	0	0	0		0	1
GERMANY	KONSTANZ (FMRD II 2 2125)		SITE		0	0	0	0	0	2	0		0	0
GERMANY	MAHLBERG (FMRD II 2 2142)		SITE		1	2	1	0	0	0	0		0	0
GERMANY	BADENWEILER (FMRD II 2 2160)		SITE		1	0	0	0	0	0	0		0	0
GERMANY	SCHWORSTADT (FMRD II 2 2242)		SITE		0	1	0	0	0	0	0		0	0
GERMANY	LANDKREIS ALZEY (FMRD IV 1 1002)		SITE		0	0	1	0	0	0	0		0	0
GERMANY	LANDKREIS ALZEY (FMRD IV 1 1005)	268 H	H	302	32	21	67	34	28	4	0		0	0
GERMANY	LANDKREIS BINGEN (FMRD IV 1 1054)		SITE		0	0	0	0	0	1	0		0	0
GERMANY	BINGEN (FMRD IV 1 11058-9)		SITE		0	0	2	0	0	0	0		0	0
GERMANY	NIEDERENGELHEIM (FMRD IV 1 1092)	274 H	H	1500	0	0	0	0	0	0	0		0	1
GERMANY	STADTKREIS MAINZ (FMRD IV 1 1148)		SITE		1	0	0	0	0	0	0		0	0
GERMANY	STADTGEBIET VON MAINZ (FMRD IV 1 1157)		SITE		2	1	1	2	3	0	1		1	0
GERMANY	MAINZ (FMRD IV 1 1164)	265 H	H	1872	0	1	3	0	0	0	0		0	0
GERMANY	MAINZ (FMRD IV 1 1165)	274 H	H	100	0	0	0	0	0	0	0		0	1
GERMANY	MAINZER RAUM (FMRD IV 1 1174)		SITE		1	0	0	1	1	0	0		0	0
GERMANY	MAINZ - KEBBICH (SAALBURG J 1888)	274 H	H	423	0	0	0	0	0	0	0		0	1
GERMANY	FEILBINGERT (FMRD IV 2 2296)	274 H	H	102	0	0	1	1	1	2	0		0	1
GERMANY	KATTENES (ZN 1880)	274 H	H	12083	3	1	2	4	7	19	0		3	22
GERMANY	SATRUP (FMRD VIII 1077)		SITE		1	0	0	0	0	0	0		0	0
GERMANY	FLERZHEIM (BEIHEFTE BJ 48)		SITE		6	1	5	2	4	27	0		0	0
GERMANY	BRAUWELER (BEIHEFTE BJ 42)	274 H	H	2823	0	0	3	1	2	8	3		0	2

POSTUMUS	DATE LAST COIN	HOARD/ SITE	No. IN HOARD	MINT 1 TRIER	MINT 2 COLOGNE
COUNTRY					
SWITZERLAND	288 H	HOARD	2		
SWITZERLAND		AUGST* (CUNETIO)	32	191	4
SWITZERLAND		BASEL (ROMISCHE MUNZ ... 1851)	6	545	6
SWITZERLAND		LIESTALER MUSEUMS BASEL (BASLER Z'SCHRIFT 29)	9	20	10
SWITZERLAND	273 H	OBERRIET	3	1	18
SWITZERLAND		VATTIS (JUNIG)	0	0	0
SPAIN/PORTUGAL	268 H	SERRANIA/GIBALTAR (NC 1882)	12	6	0
SPAIN/PORTUGAL	268 H	ALTAFULIA (NUMISMA 27)	1	0	0
SPAIN/PORTUGAL		CLUNIA (CLUNIA III)	0	0	0
SPAIN/PORTUGAL		CONIMBRIGA (CONIMBRIGA III)	0	0	0
SPAIN/PORTUGAL		TARRAGONA MUSEUM (ACTA NUMISMATICA VII)	2	0	0
SPAIN/PORTUGAL		PAIS VALENCIANO (BARCELONA II)	1	2	0
ITALY		VICENZA PROVINCE (RMRV6/IV/1)	0	0	0
HUNGARY		HUNGARY (FMRU 1)	0	0	0
TOTALS			6909	16120	7584
			16235	3557	638
				1157	37
				5066	1257

VICTORIUS		REFERENCE	LAST COIN	HOARD/SITE	HOARD TOTAL	MINT 1 - TRIER						MINT 2 - COLOGNE					
COUNTRY	LOCATION					1	2	3	4	6	1	2	3	4	6		
BRITAIN	CUNNETO		274 H		54951	22	378	4032	95	402	90	1200	845	18	278		
BRITAIN	MINSTER		281 H		3235	1	17	164	3	141	3	35	48	5	68		
BRITAIN	APPLESHAW		282 H		3052	1	17	205	1	180	3	70	50	5	80		
BRITAIN	KIRKBY		282 H		304	0	0	30	0	11	0	16	4	0	12		
BRITAIN	NORMANBY		285 H		47303	8	251	3175	39	2522	58	802	860	43	1371		
BRITAIN	ADDINGTON		270 H		170	0	0	14	0	18	0	8	1	1	9		
BRITAIN	VINTNER'S PARK		272 H		39	0	11	183	4	111	3	47	47	5	78		
BRITAIN	CADEBY		274 H		1691	0	11	183	4	111	3	47	47	5	78		
BRITAIN	EPPING FORREST		274 H		53	0	0	0	0	0	0	0	0	0	1		
BRITAIN	MALBY		282 H		3488	1	28	415	4	180	7	131	95	3	83		
BRITAIN	MILCH WENLOCK		284 H		2591	4	4	208	67	74	1	62	52	2	67		
BRITAIN	BLACKWOOD		288 H		22438	3	108	1270	14	1070	23	380	358	21	688		
BRITAIN	PURBROOK HEATH		272 H		207	0	2	23	0	0	0	10	6	0	1		
BRITAIN	VINTNER'S PARK ADDENDA		272 H		19	0	0	2	0	4	0	0	0	0	2		
BRITAIN	EAST MERSEA		273 H		657	0	1	69	0	44	0	25	27	1	26		
BRITAIN	MARKET DEEPING		273 H		2658	4	30	478	2	180	13	102	102	7	65		
BRITAIN	ALBOURNE		274 H		4780	0	35	559	13	283	10	137	144	8	156		
BRITAIN	TATTERSHALL THORPE		281 H		5074	1	32	400	5	301	8	99	103	8	193		
BRITAIN	CHILD'S ERGALL		281 H		2897	0	17	232	5	171	2	78	89	1	80		
BRITAIN	COLEBY		281 H		7787	0	23	488	9	353	2	116	123	6	238		
BRITAIN	MONKTON FARLEIGH		286 H		3468	3	15	218	3	180	2	67	65	2	88		
BRITAIN	WICKHAM MARKET		273 H		1598	1	18	230	3	73	4	81	54	4	85		
BRITAIN	OLIVER'S ORCHARD		274 H		6123	3	54	759	10	307	14	181	177	10	182		
BRITAIN	WEST MESTON		274 H		61	0	0	3	0	7	0	1	0	0	0		
BRITAIN	COMBE HILL		273 H		144	0	0	19	0	15	0	4	0	0	9		
BRITAIN	LOSTWITHIEL		274 H		103	0	0	10	0	3	0	3	0	0	2		
BRITAIN	BATH AREA		286 H		1807	0	10	120	4	78	1	27	28	0	56		
BRITAIN	CLAYDON PIKE		286 H		42	0	0	0	0	0	0	1	0	0	0		
BRITAIN	BASSALEG		270 H		904	0	2	10	0	0	1	3	1	0	0		
BRITAIN	CAERLEON		270 H		51	0	1	4	0	0	2	1	0	0	0		
BRITAIN	ALBOURNE ADDENDA		274 H		297	0	3	13	0	20	0	11	3	0	11		
BRITAIN	WISHAW		274 H		159	0	2	22	0	10	0	6	1	1	4		
BRITAIN	CHALGROVE		279 H		4145	2	20	228	0	173	2	73	54	2	101		
BRITAIN	CHAUFONT		281 H		8882	0	48	582	5	253	7	208	169	8	181		
BRITAIN	WORTLEY		270 H		81	0	0	0	0	0	0	2	0	0	0		
BRITAIN	WAREHAM I		271 H		1586	0	3	6	0	0	0	7	1	0	0		
BRITAIN	WAREHAM II		282 H		33	0	1	1	0	0	0	1	0	0	0		
BRITAIN	BOTLEY		274 H		1394	0	12	172	5	118	0	41	43	4	64		
BRITAIN	BOWCOMBE		277 H		472	0	2	40	0	21	2	18	7	1	7		
BRITAIN	ASTHALL		287 H		25	0	0	1	0	1	0	0	0	0	0		
BRITAIN	LIGHTWOOD		280 H		2461	0	10	130	2	105	2	44	23	4	61		
BRITAIN	LUPTON		274 H		303	1	20	0	0	13	0	4	5	0	73		
BRITAIN	EMNETH		274 H		1584	2	20	211	4	94	3	68	48	0	73		
BRITAIN	BOOTHSTOWN		274 H		540	0	0	43	0	22	2	9	17	0	22		
BRITAIN	ST. LEONARDUS		340 H		128	0	0	0	1	0	0	0	0	0	0		
BRITAIN	CAMERTON, BATH		n/a	SITE	n/a	0	0	2	0	1	0	1	0	0	0		
BRITAIN	MYTHOLMOYD		n/a	SITE	n/a	0	0	0	0	0	0	0	0	0	0		
BRITAIN	CAMERTON, BATH III		n/a	SITE	n/a	0	1	3	1	20	0	16	9	0	21		
BRITAIN	MIDDLEHAM (?) YORKSHIRE		n/a	SITE	n/a	0	0	3	0	2	0	0	0	0	2		
BRITAIN	BEACHY HEAD 1881		280 H		3927	0	21	341	6	305	4	102	69	0	184		
BRITAIN	ERWYHEN		282 H		884	0	3	40	1	33	0	10	15	0	23		
BRITAIN	AGDEN		282 H		2443	0	11	228	0	125	3	68	51	5	78		
BRITAIN	GARE		270 H		1084	0	0	3	0	1	2	2	1	0	1		
BRITAIN	DEEPING ST. JAMES		273 H		515	1	80	0	1	70	4	16	25	0	37		
BRITAIN	BRIGHTON		274 H		828	2	4	60	3	55	0	15	21	0	27		
BRITAIN	BEACHY HEAD 1873		273 H		5540	2	23	489	8	529	4	137	147	8	283		
BRITAIN	SELSEY		270 H		148	0	2	71	1	11	2	11	19	0	4		
BRITAIN	WELWYN		270 H		148	0	2	24	1	3	1	8	7	0	2		
BRITAIN	CHOSELEY		270 H		405	0	6	39	0	24	1	4	3	0	1		
BRITAIN	MEARE HEATH		274 H		1404	0	0	24	1	28	1	5	1	0	10		
BRITAIN	STONEA CAMP		273 H		25	0	0	3	0	1	0	1	0	0	3		

VICTORINUS		LOCATION	REFERENCE	LAST COIN	HOARD/ SITE	HOARD TOTAL	MINT 1 - TRIER					MINT 2 - COLOGNE						
COUNTRY	LOCATION						REFERENCE	LAST COIN	HOARD/ SITE	HOARD TOTAL	1	2	3	4	5	6	1	2
LUXEMBOURG	NOSPelt	FMRL I 289-70	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	RIEMICH	FMRL I 282	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	STEINFORT	FMRL I 332	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	STEINSEL	FMRL I 335	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	TETELBERG	FMRL I 342-51	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	WEILER-LA-TOUR	FMRL I 353	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	WIDDERBERG (MENSENDORF)	FMRL I 358	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	Unterstein prov	FMRL I 223	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	BLUMENTHAL (1948)	FMRL II 31	282 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUXEMBOURG	TETELBERG (1973-4)	FMRL II 31	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	TRIER	FMRD IV 301	n/a	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	TRIER	FMRD IV 302	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KOLN	FMRD VI 1001	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KOLN	FMRD VI 1003	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KOLN	FMRD VI 1007	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KOLN	FMRD VI 1008	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KOLN	FMRD VI 1010	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KOLN	FMRD VI 1012	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BAD VILBEL	FMRD V 2102	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BUTZBACH	FMRD V 2110	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FREIBURG	FMRD V 2120	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	TREBUR	FMRD V 2227	n/a	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	SELGENSTADT	FMRD V 2250	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	UNTERLANHREIS	FMRD IV 8018	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	ORSCHOLZ	TOURNAL 171/18, FMRD III 1044	270 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	ORSCHOLZ	FMRD III 1154	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	REGENSBURG	FMRD I 3084	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FORCHHEIM	FMRD I 4017	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	WEISSENBURG	FMRD I 5059	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	HEIDELBERG	FMRD II 1069	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	REIHEL	FMRD II 2058	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KONSTANZ	FMRD II 2114	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KONSTANZ	FMRD II 2125	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FENNERSBERG	FMRD II 2200	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	LANDKREIS ALZEY	FMRD IV 1002	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	LANDKREIS BINGEN	FMRD IV 1054	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BINGERBRUCK	FMRD IV 1082	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	NIEDERBINGELHEIM	FMRD IV 1082	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FINTHEN	FMRD IV 1117	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	STADTKREIS MAINZ	FMRD IV 1148	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	STADTGEBIET VON MAINZ	FMRD IV 1157	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ	FMRD IV 1155	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ-REITZENHEIM	FMRD IV 1179	320 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ-WEISENAU	FMRD IV 1197	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ-WEISENAU	FMRD IV 1189	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ - KERNICH	SAALBURG JAHRBUCH 1988	423	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FEILBINGERT	FMRD IV 2298	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KRINKBERG	FMRD VII 1052	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MECKLENBERG	FMRD XIV 3038	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	PLERZHEIM	BEIHEFTE BJ 48	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BRADUWEILER	BEIHEFTE BJ 42	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KATTENES	ST. MARD I	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AUSTRIA	VINDONISSA	VINDONISSA	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SWITZERLAND	VATTIS	VINDONISSA	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SWITZERLAND	BASLE	ROMISCHE MUNZEN 1851	n/a	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	LISBON	COIN HOARDS VII	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	CLUNIA	CLUNIA	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	PAIS VALENCIANO	BARCELONA II	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	CONIMBRIGA	CONIMBRIGA	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SPAIN/PORTUGAL	VILA CAIZ	PORTUGALA II/III	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TETRICUS1	SITE	REFERENCE	LAST COIN	HOARHOARD	No. N	MINT 1					MINT 2					5 or 6	
						1	2	3	4	5	1	2	3	4	5		6
FRANCE	SEAS	TOURNAI 17/18	274 H	1312	1	1	42	143	14	0	0	0	0	0	17	38	73
FRANCE	ALLONIES 2	TOURNAI 17/18	274 H	3814	2	3	71	335	282	0	0	0	0	39	56	118	
FRANCE	LA VILLEDIEU (ARDECHE)	RN 1973	275 H	258	0	0	0	0	0	0	0	0	0	0	0	0	
FRANCE	MARGAT-ENCROZON	RN II	276 H	1943	0	0	6	21	20	0	0	0	0	7	5	0	
FRANCE	AMIENS	TM V	276 H	235	0	0	8	45	45	0	0	0	0	2	8	25	
FRANCE	AVENUE DE CHOISY PARIS	TM X	274 H	76	0	0	1	5	1	0	0	0	0	1	1	1	
FRANCE	AUTHIEUX II	TM XI	284 H	1091	0	0	0	1	0	0	0	0	0	0	0	0	
FRANCE	LUTZARCHES (VAL-DOISE)	TM XIII	284 H	85	0	0	0	1	1	0	0	0	0	0	0	0	
FRANCE	BAVAL	GALLIA SUPPL. 12	284 H	6658	0	0	1	8	15	0	2	0	0	3	4	0	
FRANCE	SAINT-MAURICE-DE-GOURDANS	TM XVI	274 H	1272	0	1	10	48	31	0	0	7	0	10	21	5	
FRANCE	MELLE	ACTA NUMISMATICA VII	?	850	0	0	11	81	45	0	0	0	1	2	8	14	
FRANCE	GRAINCOURT (PAS DE CALAIS)	BEHEFTE BJ 42	274 H	?	2	0	63	218	333	0	0	1	6	28	56	54	
FRANCE	ALVILLERS (LOIRET)	BEHEFTE BJ 42 RN 1856	282 H	807	0	0	28	82	87	0	0	4	4	15	38	19	
FRANCE	THIVARS	BEHEFTE BJ 42	274 H	6011	4	7	208	715	600	0	0	4	80	18	118	258	
FRANCE	LA VINEUSE (SAONE ET LOIRE)	BEHEFTE BJ 42	274 H	8760	0	1	112	402	331	0	0	1	28	14	72	139	
FRANCE	CLAMENCY (NEVRE)	BEHEFTE BJ 42	274 H	2475	0	0	43	198	158	0	0	0	15	7	15	32	
FRANCE	FORGES LES BAINS (SEINE ET OISE)	BEHEFTE BJ 42 RN 1987	274 H	1109	0	4	23	79	98	0	0	2	9	6	19	32	
FRANCE	LA BLANCHARDIERE (SARTHE)	BEHEFTE BJ 42	274 H	4483	3	4	254	800	878	0	5	58	38	84	551	0	
FRANCE	JUBLAINS (MAYENNE)	BEHEFTE BJ 42	274 H	4483	0	0	83	278	281	0	0	23	18	35	184	0	
FRANCE	SAINT-MESMIN (AUBE)	RN 1842	309 H	1233	0	0	4	34	9	0	0	1	1	12	9	9	
FRANCE	MONTBOUY	GALLIA 12 Suppl	?	3310	0	0	0	0	0	0	0	0	0	0	0	0	
FRANCE	THIBOUVILLE (EURE)	GALLIA 18	288 H	3256	0	0	0	0	1	2	0	0	0	0	0	0	
FRANCE	THROYES (AUBE)	SEFN 44	278 H	34	0	0	0	0	1	0	0	0	0	0	0	0	
FRANCE	VILLERS-SAINT-BENOIT (YONNE)	SEFN 40	274 H	27	0	0	0	1	2	0	0	0	0	0	0	0	
FRANCE	MONTEREAU	RN 1872	268 H	350	0	0	0	0	0	0	0	0	0	0	0	0	
FRANCE	CLEMONT	RN 1854	286 H	500	0	0	0	0	0	0	0	0	0	0	0	0	
FRANCE	SAINTE-PALLAYE (YONNE)	TM XIV	283 H	8884	0	16	130	640	842	0	0	4	82	28	133	187	
NETHERLANDS	ARDENBURG	ROB 17	274 H	148	0	0	0	0	1	0	0	0	0	0	0	0	
NETHERLANDS	VUGHT	JY MUNTEN PENNINGKUNDE 523	274 H	4778	0	0	113	453	323	0	1	38	17	76	137	30	
LUXEMBOURG	ALTRIER	FMRL 16	SITE M/8		0	0	1	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	ALTRIER	FMRL 18	SITE M/8		0	0	0	0	1	0	0	0	0	0	0	0	
LUXEMBOURG	ASPELT	FMRL 12	SITE M/8		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	BETAGNE	FMRL 135	SITE M/8		0	0	1	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	BORN	FMRL 148	SITE M/8		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	EURMERANGE	FMRL 57	H		0	0	0	1	1	0	0	1	0	0	0	0	
LUXEMBOURG	DALHEIMRIGGIACUS	FMRL 80	H		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	DALHEIMRIGGIACUS	FMRL 82	SITE M/8		3	0	4	7	20	0	1	2	0	0	3	7	
LUXEMBOURG	ETTERACH	FMRL 108	SITE M/8		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	EHREN	FMRL 108	SITE M/8		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	ETTELBRUCK	FMRL 124	H		0	0	0	0	1	2	0	0	0	1	0	0	
LUXEMBOURG	GRAND DUCHE LUXEMBOURG	FMRL 143	H		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	MUSEUM - TESOR 1	FMRL 144	H		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	GRAND DUCHE LUXEMBOURG	FMRL 145	H		0	0	1	2	4	0	0	0	1	0	3	0	
LUXEMBOURG	MUSEUM - TESOR 3	FMRL 148	SITE M/8		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	GREISCH	FMRL 148	SITE M/8		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	KAHLER	FMRL 190	H		0	0	3	6	1	0	0	0	0	0	0	1	
LUXEMBOURG	KLEINBETTINGEN	FMRL 195	SITE M/8		0	0	0	0	0	0	0	0	0	0	0	0	
LUXEMBOURG	LINTGEN	FMRL 205	SITE M/8		0	0	0	0	1	0	0	0	0	0	0	0	
LUXEMBOURG	PFaffenThal	FMRL 217	SITE M/8		0	0	1	0	1	0	0	0	0	0	0	0	
LUXEMBOURG	MARSCHERWALD	FMRL 228	SITE M/8		0	0	0	0	1	0	0	0	0	0	0	0	
LUXEMBOURG	MERSCH	FMRL 1241	SITE M/8		0	0	0	2	0	0	0	0	0	0	0	0	
LUXEMBOURG	NOSPELT	FMRL 1269/70	SITE M/8		0	0	1	1	2	0	0	0	0	0	0	1	
LUXEMBOURG	REIANG	FMRL 1278	SITE M/8		0	0	0	0	1	0	0	0	0	0	0	0	
LUXEMBOURG	REIMICH	FMRL 1298	SITE M/8		0	0	0	0	1	0	0	0	0	0	0	0	
LUXEMBOURG	RIPPWEILER	FMRL 1299	SITE M/8		0	0	2	0	1	0	0	0	0	0	0	0	
LUXEMBOURG	STEINSEL	FMRL 1335	SITE M/8		0	0	0	4	0	0	0	1	0	0	0	0	
LUXEMBOURG	TETELBIERG	FMRL 1342/1415/16/1	SITE M/8		0	0	3	31	29	0	0	3	0	3	14	1	
LUXEMBOURG	WIDEBERG (MENSENDORF)	FMRL 1389	SITE M/8		0	0	0	0	1	0	0	0	0	0	1	2	
LUXEMBOURG	TETELBIERG (1873-4)	FMRL II 201	274 H	57	0	0	0	4	6	0	0	1	1	0	1	2	
GERMANY	PEISSENBERG	FMRD II 1337	H		0	0	0	0	0	0	0	0	0	0	0	0	
GERMANY	MOOSBERG	FMRD II 1326	SITE M/8		0	0	0	0	0	0	0	0	0	0	0	0	

TETRACUS I	SITE	REFERENCE	LAST COIN	No. IN HOAREBOARD	MINT 11					MINT 2							
					TRIER	1	2	3	4	5	1	2	3	4	5	6	Sort
GERMANY	PUPPLING	FMRD 11 1337	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	STEINKIRCHEN	FMRD 12 2013	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	GOOGING	FMRD 12 2030	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	UNKDOWN	FMRD 12 2031	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	GROSSBERG	FMRD 13 3026	n/a	286 H	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	REGENSBURG	FMRD 13 3032/472/445	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FORCHHEIM	FMRD 14 4017	n/a	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	NEUNSLINGEN	FMRD 15 5094	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	WEISSENBURG I. BAY	FMRD 15 5098	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	STOCKSTADT am MAIN	FMRD 16 6073/5	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	WIESLOCH	FMRD 11 1068	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KARLSRUHE/UMHLBURG	FMRD 11 1088	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	SCHRESEM	FMRD 11 1148	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	PROBHEIM	FMRD 11 1180	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	REIBEL	FMRD 12 2058	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KONSTANZ	FMRD 12 2123	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	GENGENBACH	FMRD 12 2194	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	LAUFENBURG	FMRD 12 2222	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	RHEINFELDEN	FMRD 12 2234	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	SACKINGEN	FMRD 12 2237	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BADEN-BADEN	FMRD 12 m 2197/1	n/a	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	HUTTERSDORF	FMRD 13 1134	n/a	727	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	LANCKREIS ALZEY	FMRD 14 1002	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	WORSTADT	FMRD 14 1050	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	LANDKREIS BINGEN	FMRD 14 1054	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BINGERBRÜCK	FMRD 14 1082	n/a	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	NIEDERKINGELHEIM	FMRD 14 1135	n/a	1500	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	NACKENHEIM	FMRD 14 1135	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	STADTGEBIET VON MAINZ	FMRD 14 1148	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ	FMRD 14 1165	n/a	100	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZER RAUM	FMRD 14 1174	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ-MONBACH	FMRD 14 1165	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ-WEISENAU	FMRD 14 1189	n/a	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ-WEISENAU	FMRD 14 1189	n/a	115	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MAINZ-Weitrich	FMRD 14 1207	n/a	383 H	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	SAALBURG JAHRBUCH 1988	FMRD 14 1207	n/a	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FEILBERG	FMRD 14 2296	n/a	102	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	TRIER	FMRD 14 31 3001/2	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	UNTERLAHNRHEIN	FMRD 14 5 5018	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	LOBSCH	FMRD 14 21 2017	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	DIEBURG	FMRD 14 21 2069	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BUTZBACH	FMRD 14 21 2110	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FREIBURG	FMRD 14 21 2120	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FREIBURG	FMRD 14 21 2121	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	OBERFLORSTADT	FMRD 14 21 2144	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	GROSS-GERAU	FMRD 14 21 2210	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	RUSSELHEIM	FMRD 14 21 2223	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	SELGENSTADT	FMRD 14 21 2250	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	STARKENBURG	FMRD 14 21 2255	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	VANGELICH HESSEN	FMRD 14 21 2257	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	VILLA BEI RAUHEIM	FMRD 14 21 2259	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	ROCKST/ NIED UND UMGEBUNG	FMRD 14 21 2289	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	HAUSER	FMRD 14 21 2302	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	STADT KÖLN	FMRD 14 1/1 1001/2/3/5/7/8/9/10/11/12	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	GROSS REKEN	FMRD 14 4 4027	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	COESFELD	FMRD 14 5 5018	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	CASTROP RAUXEL	FMRD 14 5 5018	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	MIECKLENBERG	FMRD 14 5 5018	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	FLECKHEIM	BEHÖRDE BJ 48	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	BRAUWEILER	BEHÖRDE BJ 42	n/a	2823	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	KATTENBERG	BEHÖRDE BJ 42	n/a	274 H	0	0	0	0	0	0	0	0	0	0	0	0	0
GERMANY	VINDONISSA	FMRD 14 21 2302	n/a	12083	0	0	0	0	0	0	0	0	0	0	0	0	0
AUSTRIA	VINDONISSA	FMRD 14 21 2302	n/a	12083	0	0	0	0	0	0	0	0	0	0	0	0	0

TETRACUS I		REFERENCE	LAST COIN	HOARD No. IN / SITE	HOARD	mint 1, issue 4	mint 1, issue 5	mint 2, issue 6
BRITAIN	ADDINGTON	CHRB II	272 H	170		0	0	0
BRITAIN	VINTNER'S PARK	CHRB II	272 H	39		0	0	0
BRITAIN	CADNEY	CHRB II	274 H	1681		45	13	27
BRITAIN	EPPING FOREST	CHRB II	274 H	53		3	0	0
BRITAIN	MALBY	CHRB II	282 H	3458		109	187	47
BRITAIN	MUCH WENLOCK	CHRB II	284 H	2561		199	132	53
BRITAIN	SOMERSET	CHRB II	284 H	181		1	1	2
BRITAIN	BLACKMOOR	CHRB II	286 H	22436		1796	1114	703
BRITAIN	PURBROOK HEATH	CHRB IV	272 H	207		0	0	0
BRITAIN	VINTNER'S PARK <i>abband.</i>	CHRB IV	272 H	19		0	0	0
BRITAIN	EAST MERSEA	CHRB IV	273 H	657		15	0	5
BRITAIN	MARKET DEEPING	CHRB IV	273 H	2863		8	0	2
BRITAIN	ALBOURNE (<i>schedenda</i>)	CHRB IV (*)	274 H	316		188	104	104
BRITAIN	TATTERSHALL THORPE	CHRB IV	281 H	5074		236	148	148
BRITAIN	CHILD'S ERGALL	CHRB V	281 H	2687		172	158	81
BRITAIN	COLEBY	CHRB V	281 H	7787		570	283	207
BRITAIN	MONKTON FARLEIGH	CHRB V	286 H	3488		222	162	72
BRITAIN	OLIVER'S ORCHARD	CHRB VI	274 H	6123		18	7	14
BRITAIN	WICKHAM MARKET	CHRB VI	273 H	1969		6	0	10
BRITAIN	WESTMESTON	CHRB VI	274 H	61		0	0	0
BRITAIN	COMBE HILL	CHRB VI	273 H	144		1	0	0
BRITAIN	LOSTWITHIEL	CHRB VI	274 H	103		2	3	1
BRITAIN	BATH AREA	CHRB VI	286 H	1807		148	90	58
BRITAIN	NORMANBY	CHRB VII	289 H	47909		3538	2156	1312
BRITAIN	MINSTER SHEPPEY	CHRB VII	281 H	3235		208	121	78
BRITAIN	APRLESHAW	CHRB VIII	282 H	3052		239	148	102
BRITAIN	KIRBY NOTTS	CHRB VIII	287 H	304		8	11	7
BRITAIN	WISHAM	CHRB IX	274 H	185		3	0	4
BRITAIN	NINESPRINGS VILLA	CHRB IX	274 H	61		3	0	3
BRITAIN	CHALGROVE	CHRB IX	278 H	4145		243	146	98
BRITAIN	CHALFONT	CHRB IX	281 H	6882		227	218	99
BRITAIN	WAREHAM II	CHRB X	282 H	33		1	0	0
BRITAIN	BOTLEY	CHRB X	274 H	1854		21	1	18
BRITAIN	BOWCOMBE	CHRB X	277 H	472		26	17	8
BRITAIN	ASTHALL	CHRB X	287 H	25		1	0	0
BRITAIN	CUNETTO	CHRB X	274 H	54851		569	410	225
BRITAIN	EMNETH	CHRB X	274 H	1654		33	0	20
BRITAIN	BOOTHSTOWN	CHRB X	274 H	540		20	15	12
BRITAIN	CAMERTON BATH	CHRB X	n/a	n/a		1	0	0
BRITAIN	MYTHOLMOYD	CHRB X	n/a	n/a		34	22	10
BRITAIN	CAMERTON, BATH III	CHRB X	n/a	n/a		5	2	3
BRITAIN	MIDDLEHAM?	CHRB X	n/a	n/a		4	0	0
BRITAIN	BEACHY HEAD 1881	CHRB X	274 H	32		67	173	0
BRITAIN	ERWHEEN	CHRB X	282 H	884		45	29	18
BRITAIN	AGDEN	CHRB X	282 H	2443		138	135	64
BRITAIN	BRIGHTON	CHRB X	274 H	928		175	40	43
BRITAIN	BEACHY HEAD 1873	CHRB X	275 H	5640		288	0	213
BRITAIN	MEARE HEATH	CHRB X	274 H	1404		11	29	8
BRITAIN	STONEA CAMP	CHRB X	273 H	26		1	3	0
BRITAIN	WESTMOOR	CHRB X	273 H	34		1	1	1
BRITAIN	WISBECH	CHRB X	395 H	18		1	0	0
BRITAIN	WALBOTTLE (THROCKLEY)	CHRB X	274 H	878		15	7	6
BRITAIN	COED-Y-GLORIAN	CHRB X	274 H	110		3	2	0
BRITAIN	LLANDEYRN II	CHRB X	274 H	1084		28	23	9
BRITAIN	RIBY	CHRB X	282 H	13485		648	577	367
BRITAIN	HACKENSALL HALL FARM	CHRB X	273 H	339		22	13	12
BRITAIN	DEERING ST. JAMES	CHRB X	274 H	516		3	0	0
BRITAIN	HOLLINGBOURNE	CHRB X	274 H	5369		130	72	34
BRITAIN	TOURNAI 18	CHRB X	274 H	437		29	0	24
BRITAIN	WARKENCOURT	CHRB X	276 H	1935		67	137	17
BRITAIN	ST. MARO	CHRB X	278 H	5467		282	222	88
BRITAIN	CHEZY-SUR-MARNE	CHRB X	274 H	604		33	0	57
FRANCE	BISCHOFFSHEIM	CHRB X	274 H	8057		270	2	152
FRANCE	BOURG-BLANC	CHRB X	278 H	154		0	0	0

COUNTRY	SITE	REFERENCE	LAST COIN	HOARD No. In SITE	HOARD	mint 1, issue 4	mint 1, issue 5	mint 2, issue 6
FRANCE	SENS	JOURNAL 17/78	274 H	1312	77	0	0	74
FRANCE	ALLONES 2	JOURNAL 17/78	274 H	3814	199	131	0	79
FRANCE	LAVALLEDIEU (ARDECHE)	RN 1873	276 H	288	1	1	1	5
FRANCE	MARGAT-ENCROZON	TM II	276 H	1545	8	8	8	5
FRANCE	AMIENS	TM V	276 H	235	24	14	14	8
FRANCE	AVENUE DE CHOISY, PARIS	TM X	274 H	75	2	3	1	1
FRANCE	AUTHIEUX II	TM XI	284 H	1081	0	3	9	9
FRANCE	LIZARCHES (VAL-DOISE)	TM XII	348 H	83	0	0	2	2
FRANCE	BAVA	GALLIA SUPPL. 12	288 H	6856	4	5	1	1
FRANCE	SANT-MAURICE-DE-GOURDANS	TM XVI	284 H	1272	37	25	11	11
FRANCE	MELLE	ACTA NUMISMATICA VII	274 H	850	32	24	10	10
FRANCE	GRAINCOURT (PAS DE CALAIS)	BEIHEFTE BJ 42	?	?	?	?	?	?
FRANCE	AUVILLIERS (LOIRET)	BEIHEFTE BJ 42	274 H	907	128	211	95	31
FRANCE	THIAIS	BEIHEFTE BJ 42	282 H	8011	601	247	180	180
FRANCE	LA VINEUSE (SAONE ET LOIRE)	BEIHEFTE BJ 42	274 H	8780	247	200	82	82
FRANCE	CLAMENCY (NIEVRE)	BEIHEFTE BJ 42	274 H	2475	118	103	43	43
FRANCE	FORGES LES BAINS (SEINE ET OISE)	BEIHEFTE BJ 42RN 1967	274 H	1109	68	52	28	28
FRANCE	LA BLANC-HARDIERE (SARTHE)	BEIHEFTE BJ 42	274 H	8578	609	470	80	80
FRANCE	JUBLAINS (MAYENNE)	BEIHEFTE BJ 42	274 H	4483	205	154	28	28
FRANCE	SANT-MESMIN (AUBE)	RN 1882	276 H	1233	19	2	11	11
FRANCE	MONTBOUY	GALLIA 12 Suppl	308 H	3310	1	1	1	1
FRANCE	THIBOUVILLE (EURE)	GALLIA 18	288 H	3268	1	1	0	0
FRANCE	TROYES (AUBE)	ESFN 44	276 H	34	0	0	0	0
FRANCE	VILLIERS-SAINT-BENOIT (YONNE)	ESFN 40	274 H	27	3	0	1	1
FRANCE	MONTEREAU	RN 1872	288 H	339	0	0	0	0
FRANCE	CLEMONT	RN 1864	288 H	800	0	0	0	0
FRANCE	SAINTE-PALLAYE (YONNE)	TM XIV	283 H	8864	372	470	199	199
NETHERLANDS	AARDENBURG	ROB 17	274 H	148	0	0	0	0
NETHERLANDS	VUGHT	JVMUNTEN PENNINGKUNDE 523	274 H	4778	120	108	111	111
LUXEMBOURG	ALTRIER	FMRL 10	SITE	n/a	1	1	1	1
LUXEMBOURG	ALTRIER	FMRL 8	SITE	n/a	0	0	0	0
LUXEMBOURG	ASPELT	FMRL 12	SITE	n/a	0	1	0	0
LUXEMBOURG	BEYAGNE	FMRL 35	SITE	n/a	0	0	0	0
LUXEMBOURG	BORN	FMRL 48	SITE	n/a	0	0	0	0
LUXEMBOURG	BURERANGE	FMRL 57	H	n/a	4	1	1	1
LUXEMBOURG	DALHEIM-RICCIACIUS	FMRL 160	H	n/a	1	1	0	0
LUXEMBOURG	DALHEIM-RICCIACIUS	FMRL 182	SITE	n/a	5	8	3	3
LUXEMBOURG	ETTERACH	FMRL 106	SITE	n/a	0	0	1	1
LUXEMBOURG	ERHREN	FMRL 108	SITE	n/a	0	0	0	0
LUXEMBOURG	ETTELBRUCK	FMRL 124	H	n/a	0	1	0	0
LUXEMBOURG	GRAND DUCHE LUXEMBOURG							
LUXEMBOURG	MUSEUM - TESSOR 1	FMRL 143	H	n/a	0	1	0	0
LUXEMBOURG	MUSEUM - TESSOR 1	FMRL 144	H	n/a	0	0	1	1
LUXEMBOURG	GRAND DUCHE LUXEMBOURG							
LUXEMBOURG	MUSEUM - TESSOR 3	FMRL 145	H	n/a	0	1	0	0
LUXEMBOURG	GREISCH	FMRL 146	SITE	n/a	0	0	0	0
LUXEMBOURG	KAHLER	FMRL 180	H	n/a	1	0	0	0
LUXEMBOURG	KLEINBETTINGEN	FMRL 195	SITE	n/a	0	0	0	0
LUXEMBOURG	LINTGEN	FMRL 208	H	n/a	0	0	0	0
LUXEMBOURG	FAFENTHAL	FMRL 217	SITE	n/a	0	0	0	0
LUXEMBOURG	MARSCHERWALD	FMRL 228	SITE	n/a	0	0	0	0
LUXEMBOURG	MERSCH	FMRL 241	SITE	n/a	1	0	0	0
LUXEMBOURG	NOSPELT	FMRL 269/70	SITE	n/a	0	0	0	0
LUXEMBOURG	PETANGE	FMRL 278	SITE	n/a	0	0	1	1
LUXEMBOURG	REMICH	FMRL 288	SITE	n/a	0	0	0	0
LUXEMBOURG	RIPPWEILER	FMRL 289	SITE	n/a	0	0	0	0
LUXEMBOURG	STEINSEL	FMRL 335	SITE	n/a	1	1	0	0
LUXEMBOURG	TELLEBERG	FMRL 342/344/5/7/61	SITE	n/a	12	14	6	6
LUXEMBOURG	WIDDEBERG (MENSENDORF)	FMRL 389	SITE	n/a	0	0	1	1
LUXEMBOURG	TELLEBERG (1873-4)	FMRL 201	SITE	n/a	4	0	0	0
GERMANY	PEISSENBERG	FMRO 11 1327	274 H	57	4	0	0	1
GERMANY	MOOSBERG	FMRO 11 1328	SITE	n/a	0	0	0	0

TETRICUS II		REFERENCE	LAST CON.	HOARD No. N / SITE / HOARD	mint 1, issue 4	mint 1, issue 5	mint 2, issue 6
GERMANY	SITE						
GERMANY	RUPPLING	FMRD I 1 1337	n/a	H7	1	0	0
GERMANY	STENKIRCHEN	FMRD I 2 2013	n/a	S7	1	0	0
GERMANY	GUGGING	FMRD I 2 2030	n/a	SITE	0	0	0
GERMANY	UNKNOWN	FMRD I 2 2031	n/a	SITE	0	0	0
GERMANY	GROSSBERG	FMRD I 3 3028	288 H	40	0	0	0
GERMANY	REGENSBURG	FMRD I 3 3062/472/4/5	n/a	SITE	1	1	2
GERMANY	FORCHHEIM	FMRD I 4 4017	274 H	285	0	0	0
GERMANY	NEUNSLINGEN	FMRD I 5 5054	n/a	H7	0	0	0
GERMANY	WEISSENBURG I. BAY	FMRD I 5 5059	n/a	SITE	0	0	0
GERMANY	STOCKSTADT am MAIN	FMRD I 6 6013/5	n/a	SITE	0	1	0
GERMANY	WIESLOCH	FMRD I 1 1068	n/a	SITE	0	1	0
GERMANY	KARLSRUHE/MIHLBURG	FMRD I 1 1068	n/a	SITE	1	0	0
GERMANY	SCHLESHEIM	FMRD I 1 1148	n/a	SITE	0	1	0
GERMANY	POFZHEIM	FMRD I 1 1180	n/a	SITE	1	0	0
GERMANY	REIGEL	FMRD I 2 2056	n/a	SITE	0	0	0
GERMANY	KONSTANZ	FMRD I 2 2125	n/a	H7	2	6	0
GERMANY	GENGENBACH	FMRD I 2 2184	n/a	SITE	0	0	0
GERMANY	LAUFENBURG	FMRD I 2 2222	n/a	SITE	0	1	0
GERMANY	RHEINFELDEN	FMRD I 2 2234	n/a	SITE	0	1	0
GERMANY	SACKINGEN	FMRD I 2 2237	n/a	SITE	0	0	1
GERMANY	BADENBADEN	FMRD I 2 M 219/71	n/a	SITE	1	0	0
GERMANY	HUTTENBORG	FMRD I 1 1134	274 H	727	5	1	3
GERMANY	LANKREIS ALZEY	FMRD I 1 1002	n/a	SITE	3	1	1
GERMANY	WORSTADT	FMRD I 1 1050	n/a	SITE	0	0	0
GERMANY	LANDKREIS BINGEN	FMRD I 1 1054	n/a	SITE	8	14	2
GERMANY	BINGERBRÜCK	FMRD I 1 1062	n/a	SITE	0	0	0
GERMANY	NIEDERENGELHEIM	FMRD I 1 1062	274 H	1500	107	43	34
GERMANY	NACKENHEIM	FMRD I 1 1135	n/a	SITE	0	0	0
GERMANY	STADTKREIS MAINZ	FMRD I 1 1148	n/a	SITE	0	0	0
GERMANY	STADTGERLET VON MAINZ	FMRD I 1 1157	n/a	SITE	2	0	2
GERMANY	MAINZ	FMRD I 1 1165	274 H	100	12	0	1
GERMANY	MAINZER RAUM	FMRD I 1 1174	n/a	SITE	1	1	0
GERMANY	MAINZ-KIMBACH	FMRD I 1 1188	n/a	SITE	1	0	0
GERMANY	MAINZ-WEISENAU	FMRD I 1 1189	274 H	82	7	0	2
GERMANY	MAINZ-WEISENAU	FMRD I 1 1201	353 H	116	2	1	1
GERMANY	MAINZ - Kirch	SAALBURG JAHRBUCH 1888	274 H	423	40	9	1
GERMANY	PELLENGERT	FMRD I 2 2296	274 H	102	5	7	2
GERMANY	TRIER	FMRD I 3/1 3001/2	n/a	SITE	12	9	5
GERMANY	UNTERLAHNRHEIS	FMRD I 5 5018	n/a	SITE	0	1	0
GERMANY	LORSCH	FMRD V 2/1 2017	n/a	SITE	0	0	0
GERMANY	DEIBURG	FMRD V 2/1 2058	n/a	SITE	0	0	0
GERMANY	BUTZBACH	FMRD V 2/1 2110	n/a	SITE	0	0	0
GERMANY	FREIBURG	FMRD V 2/1 2120	n/a	SITE	0	0	0
GERMANY	FREIBURG	FMRD V 2/1 2121	n/a	SITE	0	1	0
GERMANY	OBERFLORSTADT	FMRD V 2/1 2144	n/a	SITE	0	1	0
GERMANY	GROSS-GERAU	FMRD V 2/1 2210	n/a	SITE	0	2	0
GERMANY	RUSSELSHEIM	FMRD V 2/1 2223	n/a	SITE	0	0	0
GERMANY	BELINGENSTADT	FMRD V 2/1 2250	n/a	SITE	0	0	0
GERMANY	STARCKENBURG	FMRD V 2/1 2255	n/a	SITE	0	0	1
GERMANY	"ANGELBUCH HESSEN"	FMRD V 2/1 2257	n/a	SITE	0	1	0
GERMANY	VILLA BEL PRÄUNHEIM	FMRD V 2/1 2289	n/a	SITE	1	0	0
GERMANY	HOCHST/NIED UND UMGEBUNG	FMRD V 2/2 2289	n/a	SITE	1	1	0
GERMANY	HAUSER	FMRD V 2/2 2302	n/a	SITE	0	0	0
GERMANY	STADT KÖLN	FMRD VI 1/1 1001/2/3/5/7/8/9/10/11/12	n/a	SITE	9	9	8
GERMANY	GROSS REKEN	FMRD VI 4 4019	n/a	SITE	0	0	0
GERMANY	GOESFELD	FMRD VI 4 4027	n/a	SITE	0	0	0
GERMANY	CASTROP RAUXEL	FMRD VI 5 5019	n/a	SITE	1	0	0
GERMANY	MECKLENBERG	FMRD XIV 3038	n/a	SITE	1	0	0
GERMANY	FLERZHEIM	BEHEFTE BJ 48	n/a	SITE	0	0	0
GERMANY	BRAUNWÄLER	BEHEFTE BJ 42	274 H	2623	418	183	61
GERMANY	KATTEVES	BEHEFTE BJ 42	274 H	12083	1379	1851	281
AUSTRIA	VINDONISSA	VINDONISSA VI	n/a	SITE	2	1	0

APPENDIX 3 - BIBLIOGRAPHY OF HOARDS AND SITE FINDS

The following is a list of sources of finds information used to derive the data used in this work. The same find may occur in this list more than once depending on the actual source for the data. For example, tables reproduced in the Cunetio hoard report may be used to construct the data for Postumus for some hoards, whereas the tables reproduced in the St Mard report may be used for the Victorinus data. Finds data constructed in this manner has been kept to a minimum and where possible the original publication has been used. Whichever source has been used it has been identified on the data tables included in Appendix 2

Abbreviations used in this list are as follows:

BSFN - Bulletin de la Société Française de Numismatique

CHRB - Coin Hoards from Roman Britain

FMRD - Die Fundmünzen der Römischen Zeit in Deutschland

I Bayern; II Baden-Württemberg; III Saarland; IV Rheinland-Pfalz; V Hessen; VI Nordrhein-Westfalen; VII Niedersachsen; VIII Schleswig-Holstein und Hamburg; IX Sachsen; XI Brandenburg; XII Berlin; XIV Mecklenburg-Vorpommern

FMRL - Die Fundmünzen der Römischen Zeit im Grosserzogtum Luxemburg

NC - Numismatic Chronicle

RB - Revue Belge de Numismatique

RN - Revue Numismatique

TM - Trésors Monétaires

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AGDEN - Thompson, F.H; 'A hoard of antoniniani from Agden, near Altrincham, Cheshire' NC⁷ 2 (1962) pp. 143-55

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REGENSBURG - FMRD I 3 3062/4/72/4/5

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REIGEL - FMRD II 2 2058

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REMICH - FMRL I 292

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STADTGEBIET VON MAINZ - FMRD IV 1 1157

STADTKREIS MAINZ - FMRD IV 1 1148

STARKENBURG - FMRD V 2/1 2255

STEINFORT - FMRL I 332

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APPENDIX 4 - CUSUM TABLES

The following appendix is the data tables derived from the hoard tables in Appendix 2. For each of the issues at each of the mints there are four columns of data. The first column is the approximate date of the last official coin noted within the hoard. The second column is the percentage composition of that particular issue/mint when compared to the whole hoard. The third column represents the difference from the mean of the percentage composition whilst the fourth column is the cumulative sum of the third column. It is from the cumulative summation that cusum analysis derives its name. Often in the tables the mint and issue has been abbreviated in the form M1,2 etc. In such cases the first number refers to the mint, the second refers to the issue.

At the bottom of each of the percentage columns are some summary statistics, mean, standard deviation, number of observations and standard error.

Gallienus Rome Mint, Issue 4 UK hoards

LAST COIN	rome% issue 4	variation	cusum
261			
261			
263			
263			
267	0	-0.24696	-0.24696
267	0	-0.24696	-0.49392
269	0	-0.24696	-0.74088
270	0	-0.24696	-0.98784
270	0	-0.24696	-1.2348
270	0	-0.24696	-1.48175
270	0	-0.24696	-1.72871
271	0	-0.24696	-1.97567
271	1.176471	0.929512	-1.04616
273	0.475907	0.228948	-0.81721
273	0	-0.24696	-1.06417
273	0.198556	-0.0484	-1.11257
273	0.194175	-0.05278	-1.16536
273	0.294985	0.048026	-1.11733
273	0.251889	0.00493	-1.1124
273	0.152207	-0.09475	-1.20715
273	0.034855	-0.2121	-1.41926
273	0.147384	-0.09958	-1.51883
274	0	-0.24696	-1.76579
274	0.263871	0.016912	-1.74888
274	0.14245	-0.10451	-1.85339
274	0.502513	0.255554	-1.59783
274	0	-0.24696	-1.84479
274	0	-0.24696	-2.09175
274	1.639344	1.392385	-0.69937
274	0	-0.24696	-0.94633
274	0.202429	-0.04453	-0.99086
276	0.157573	-0.08939	-1.08024
277	0.211864	-0.03509	-1.11534
279	0.024125	-0.22283	-1.33817
280	0.127324	-0.11964	-1.45781
281	0.029931	-0.21703	-1.67483
281	0.310666	0.063707	-1.61113
281	0.11825	-0.12871	-1.73984
281	0.030912	-0.21605	-1.95588
281	0.103	-0.14396	-2.09984
282	0	-0.24696	-2.3468
282	0.065531	-0.18143	-2.52823
282	0.657895	0.410936	-2.11729
282	0.200229	-0.04673	-2.16402
282	0.133383	-0.11358	-2.2776
282	0	-0.24696	-2.52456
284	0.115785	-0.13117	-2.65573
286	0.288517	0.041558	-2.61417
287	4	3.753041	1.138867
290	0.075142	-0.17182	0.967051
290	0.182742	-0.06422	0.902834
292	0	-0.24696	0.655875
294	0.52356	0.276801	0.932476
296	0.05534	-0.19162	0.740857
296	0	-0.24696	0.493898
296	0	-0.24696	0.246939
340	0	-0.24696	-2.0E-05
mean	0.246959		
sd	0.601921		
n	53		
error	0.08268		

Gallienus Rome Mint, Issue 5 UK hoards

DATE OF LAST COIN	% Issue 5	variation from mean	cusum
261			
261			
263			
263			
267	0	-4.26477	-4.26477
267	0	-4.26477	-8.52953
269	0.12837	-4.1364	-12.6659
270	0.442478	-3.82229	-16.4882
270	0.092251	-4.17251	-20.6607
270	0	-4.26477	-24.9255
270	0	-4.26477	-29.1903
271	0.573814	-3.69115	-32.8814
271	3.529412	-0.73535	-33.6168
273	7.79298	3.528215	-30.0885
273	6.25	1.985235	-28.1033
273	5.216806	0.951841	-27.1515
273	4.271845	0.00708	-27.1444
273	2.064897	-2.19987	-29.3443
273	7.871537	3.608772	-25.7375
273	7.914764	3.649999	-22.0875
273	3.45068	-0.81409	-22.9016
273	4.98649	0.721725	-22.1798
274	3.278689	-0.98608	-23.1659
274	9.386544	5.121779	-18.0441
274	1.994302	-2.27046	-20.3146
274	2.512563	-1.7522	-22.0668
274	7.219828	2.955063	-19.1117
274	3.299857	-0.96491	-20.0767
274	16.39344	12.12868	-7.94798
274	2.564103	-1.70066	-9.64864
274	7.489879	3.225114	-6.42353
276	4.175694	-0.08907	-6.5126
277	4.661017	0.396252	-6.11635
279	3.498191	-0.76657	-6.88292
280	6.773619	2.508854	-4.37407
281	4.280156	0.015391	-4.35868
281	4.72903	0.464265	-3.89441
281	3.409539	-0.85523	-4.74964
281	3.833076	-0.43169	-5.18133
281	5.484743	1.219978	-3.96135
282	2.947196	-1.31757	-5.27892
282	4.91481	0.650045	-4.62887
282	4.276316	0.011551	-4.61732
282	5.148741	0.883976	-3.73335
282	4.712857	0.448092	-3.28525
282	3.030303	-1.23446	-4.51972
284	4.36125	0.096485	-4.42323
286	6.520485	2.25572	-2.16751
287	4	-0.26476	-2.43228
290	6.061492	1.796727	-0.63555
290	1.288108	-2.97666	-3.61221
292	5.555556	1.290791	-2.32141
294	13.61257	9.3478	7.026386
296	6.806862	2.542097	9.568483
296	0	-4.26477	5.303718
296	3.225808	-1.03896	4.264759
340	0	-4.26477	-5.6E-06
mean	4.264765		
sd	3.26916		
n	53		
error	0.449054		

Gallienus Rome Mint, Issue 6 UK hoards

	% Issue 6	diff from mean	cusum of diff
261			
261			
263			
263			
267	0	-3.24204	-3.24204
267	0	-3.24204	-6.48408
269	0	-3.24204	-9.72612
270	0	-3.24204	-12.9682
270	0	-3.24204	-16.2102
270	0	-3.24204	-19.4522
270	0.331858	-2.91018	-22.3624
271	0.318674	-2.92337	-25.2858
271	6.470588	3.228548	-22.0572
273	3.472222	0.230182	-21.8271
273	4.566787	1.324746	-20.5023
273	6.091869	2.849829	-17.6525
273	6.801008	3.558967	-14.0935
273	4.466019	1.223979	-12.8695
273	6.849315	3.607275	-9.26227
273	1.673057	-1.56898	-10.8313
273	2.359882	-0.88216	-11.7134
273	5.59191	2.349869	-9.36354
274	4.980801	1.738761	-7.62478
274	1.923077	-1.31896	-8.94374
274	4.918033	1.675992	-7.26775
274	3.084648	-0.15739	-7.42514
274	5.668016	2.425976	-4.99917
274	4.094828	0.852787	-4.14638
274	3.18258	-0.05946	-4.20584
274	6.557377	3.315337	-0.8905
274	1.139601	-2.10244	-2.99294
276	4.057514	0.815474	-2.17747
277	4.449153	1.207112	-0.97036
279	2.12304	-1.119	-2.08936
280	5.780494	2.538453	0.449095
281	3.210217	-0.03182	0.417271
281	3.939745	0.697705	1.114976
281	3.153014	-0.08903	1.025949
281	2.10879	-1.13325	-0.1073
281	3.48698	0.244939	0.137638
282	0	-3.24204	-3.1044
282	0	-3.24204	-6.34644
282	3.997379	0.755338	-5.5911
282	3.151862	-0.09018	-5.68128
282	3.89016	0.64812	-5.03316
282	3.947368	0.705328	-4.32784
282	4.127455	0.885414	-3.44242
284	3.512157	0.270117	-3.1723
286	4.183497	0.941456	-2.23085
287	0	-3.24204	-5.47289
290	2.732216	-0.50982	-5.98271
290	3.867749	0.625709	-5.357
292	3.216374	-0.02567	-5.38267
294	12.04188	8.799844	3.417174
296	0.806452	-2.43559	0.981585
296	4.427227	1.185187	2.166772
296	1.075269	-2.16677	8.0E-17
mean	3.242041		
sd	2.412098		
n	53		
error	0.331327		

Gallienus Milan Mint UK hoards

DATE	% Issue 2-6	diff from mean	% Issue 7-8	diff from mean	cusum of diff
261	0	-0.77216			
261	0	-0.77216			
263	0.038775	-0.73338			
263	0	-0.77216			
264	0	-0.77216			
267	0	-0.77216			
269	0.064185	-0.70797	0	-0.69217	-0.69217
270	0	-0.77216	0	-0.69217	-1.38435
270	0.221239	-0.55092	0	-0.69217	-2.07652
270	0	-0.77216	0	-0.69217	-2.76869
271	0.573614	-0.19854	0	-0.69217	-3.46086
271	1.176471	0.404312	1.764706	1.072533	-2.38833
273	1.368233	0.596075	0.892326	0.200153	-2.18818
273	0.761035	-0.01112	0.761035	0.068862	-2.11931
273	0.766818	-0.00534	0.697107	0.004934	-2.11438
273	1.031688	0.259529	1.252763	0.560591	-1.55379
273	2.707809	1.93565	1.763224	1.071052	-0.48274
273	1.388889	0.616731	0	-0.69217	-1.17491
273	1.98556	1.213401	0	-0.69217	-1.86708
273	0	-0.77216	1.359223	0.667051	-1.20003
273	0.294985	-0.47717	0.884956	0.192783	-1.00725
274	0.14245	-0.62971	0	-0.69217	-1.69942
274	0.837521	0.065363	0.670017	-0.02216	-1.72158
274	0.215517	-0.55664	0.215517	-0.47666	-2.19823
274	2.707867	1.935709	1.508617	0.816444	-1.38179
274	1.07604	0.303882	1.147776	0.455604	-0.92618
274	0	-0.77216	0	-0.69217	-1.61836
274	1.639344	0.867186	0	-0.69217	-2.31053
274	3.846154	3.073996	1.821862	1.12969	-1.18084
274	3.278689	2.50653	0	-0.69217	-1.87301
276	0.551507	-0.22065	0.965137	0.272964	-1.60005
277	1.059322	0.287164	0.847458	0.155285	-1.44476
279	0.482509	-0.28965	0.26538	-0.42679	-1.87155
280	1.426025	0.653867	1.578813	0.886641	-0.98491
281	1.391799	0.619641	1.346902	0.65473	-0.33018
281	0.473	-0.29916	0.551833	-0.14034	-0.47052
281	0.592249	-0.17991	0.643749	-0.04842	-0.51895
281	0.517777	-0.25438	0.690369	-0.0018	-0.52075
281	0.401855	-0.3703	0.680062	-0.01211	-0.53286
282	2.184466	1.412308	0.522778	-0.16939	-0.70225
282	0.818666	0.818666	0.491199	-0.20097	-0.90323
282	0.294889	-0.47727	0.589777	-0.1024	-1.00562
282	0	-0.77216	3.030303	2.33813	1.332507
282	1.030011	0.257853	0.718785	0.026612	1.359119
282	1.544622	0.772464	0.743707	0.051535	1.410654
282	0.657895	-0.11426	0.986842	0.29467	1.705323
284	0.617522	-0.15464	0.617522	-0.07465	1.630673
286	0.375072	-0.39709	0.663589	-0.02858	1.60209
287	0	-0.77216	0	-0.69217	0.909917
290	0.281784	-0.49037	0.528084	-0.16409	0.745829
290	0.423427	-0.34873	0.410055	-0.28212	0.463712
292	0.146199	-0.62596	1.315789	0.623617	1.087329
294	1.570681	0.798522	1.570681	0.878508	1.965837
296	0.276702	-0.49546	0.110681	-0.58149	1.384345
296	0	-0.77216	0	-0.69217	0.692173
296	0	-0.77216	0	-0.69217	-3.4E-18
mean	0.772158		0.692173		
sd	0.880601		0.654502		
n	56		50		
error	0.117675		0.092561		

Gallienus Rome Mint, Issue 4 French Hoards

LAST COIN	Gal rom% issue 4	variation	cusum
261			
262			
262			
262			
263			
263			
266	0	-0.31393	-0.31393
266	0	-0.31393	-0.62785
268	0	-0.31393	-0.94178
269	0.026378	-0.28755	-1.22933
270	0.061387	-0.25254	-1.48186
270	0	-0.31393	-1.79579
270	0.052138	-0.26179	-2.05758
270	0	-0.31393	-2.3715
270	0.227402	-0.08652	-2.45803
270	0.095238	-0.21869	-2.67672
270	0.181818	-0.13211	-2.80882
270	2.272727	1.958801	-0.85002
274	0.110254	-0.20367	-1.0537
274	0.165563	-0.14836	-1.20206
274	0.223408	-0.09052	-1.29258
274	0.270514	-0.04341	-1.33599
274	0	-0.31393	-1.64991
274	1.298701	0.984775	-0.66514
275	1.342282	1.028356	0.363217
276	0	-0.31393	0.049291
276	0	-0.31393	-0.26464
276	0.323625	0.009699	-0.25494
276	1.948052	1.634126	1.379189
279	0	-0.31393	1.065263
282	0.182998	-0.13093	0.934335
284	0.157233	-0.15669	0.777642
285	0	-0.31393	0.463716
289	0.525683	0.211757	0.675473
294	0.091659	-0.22227	0.453206
294	0.294985	-0.01894	0.434265
296	0.307125	-0.00688	0.427465
309	0	-0.31393	0.113539
309	0.200401	-0.11353	0.000013
mean	0.313926		
sd	0.562619		
n	33		
error	0.097939		

Gallienus Rome Mint, Issue 5 French hoards

DATE OF LAST COIN	%issue 5	variation	cusum
261			
262			
262			
262			
263			
263			
266	0	-7.69274	-7.692743
266	2.777778	-4.91497	-12.607708
268	0.19685	-7.49589	-20.103601
269	0.342917	-7.34983	-27.453426
270	0.828729	-6.86401	-34.31744
270	3.875969	-3.81677	-38.134214
270	3.54536	-4.14738	-42.281597
270	25	17.30726	-24.97434
270	14.66742	6.974682	-17.999659
270	11.2381	3.545352	-14.454306
270	20.54545	12.85271	-1.6015949
270	6.818182	-0.87456	-2.4761561
274	5.733186	-1.95956	-4.4357128
274	2.980132	-4.71261	-9.1483233
274	6.478838	-1.2139	-10.362228
274	5.139766	-2.55298	-12.915205
274	14.81481	7.122072	-5.7931337
274	8.831169	1.138426	-4.6547078
275	13.75839	6.065646	1.41093842
276	2.12766	-5.56508	-4.154145
276	0.324412	-7.36833	-11.522476
276	9.061489	1.368746	-10.15373
276	11.03896	3.346218	-6.8075123
279	0	-7.69274	-14.500255
282	5.489935	-2.20281	-16.703063
284	6.210692	-1.48205	-18.185114
285	0.114613	-7.57813	-25.763244
289	18.54911	10.85637	-14.906873
294	17.78185	10.08911	-4.8177648
294	18.28909	10.59634	5.77857774
296	11.33292	3.640181	9.41875858
309	2.960725	-4.73202	4.68674065
309	3.006012	-4.68673	9.676E-06
		7.692743	
		6.922613	
		33	
		1.205072	

Gallienus Rome Mint, Issue 6 French hoards

	% Issue 6	diff from mean	cusum of diff
261			
262			
262			
262			
263			
263			
266			
266			
268	0	-6.7496929	-13.4994
269	0.026378	-6.7233147	-20.2227
270	0.214856	-6.5348372	-26.7575
270	3.875969	-2.873724	-29.6313
270	20.17727	13.427575	-16.2037
270	12.5	5.75030705	-10.4534
270	11.99545	5.24575901	-5.20762
270	8.666667	1.91697372	-3.29065
270	23.09091	16.3412161	13.05057
270	6.818182	0.06848887	13.11906
274	7.717751	0.96805788	14.08712
274	1.655629	-5.0940638	8.993052
274	6.143726	-0.605967	8.387085
274	3.336339	-3.4133539	4.973731
274	3.703704	-3.0459892	1.927742
274	5.714286	-1.0354072	0.892335
275	11.07383	4.32413255	5.216467
276	0.425532	-6.324161	-1.10769
276	0	-6.7496929	-7.85739
276	6.796117	0.04642356	-7.81096
276	5.194805	-1.5548878	-9.36585
279	0	-6.7496929	-16.1155
282	3.859591	-2.8901022	-19.0056
284	6.132075	-0.6176175	-19.6233
285	0	-6.7496929	-26.373
289	14.59898	7.84928572	-18.5237
294	15.2154	8.46570577	-10.058
294	11.79941	5.04971708	-5.00825
296	10.99509	4.24539305	-0.76285
309	3.504532	-3.2451612	-4.00802
309	4.008016	-2.7416769	-6.74969
mean	6.749693		
sd	6.066162		
n	31		
error	1.089515		

Gallienus Milan Mint French hoards

DATE	% issue 2-6	diff from mean	cusum of diff	% issue 7-8	diff from mean	cusum of diff
261	0.017855	-1.33529	-1.33529			
262	0	-1.35315	-2.68844			
262	0	-1.35315	-4.04158			
262	0	-1.35315	-5.39473			
263	0	-1.35315	-6.74788			
263	2.439024	1.085878	-5.662			
266	0	-1.35315	-7.01514			
266	0	-1.35315	-8.36829			
268	0.19685	-1.1563	-9.52458	0	-1.353146	-1.35315
269	0.079135	-1.27401	-10.7986	0.026378	-1.3267678	-2.67991
270	4	2.646854	-8.15174	4.727273	3.37412668	0.694213
270	4.545455	3.192308	-4.95943	0	-1.353146	-0.65893
270	1.550388	0.197242	-4.76219	0	-1.353146	-2.01208
270	0.33763	-1.01552	-5.77771	0.030694	-1.3224524	-3.33453
270	5.213764	3.860618	-1.91709	6.41293	5.05978409	1.725252
270	3.126777	1.773631	-0.14346	3.240478	1.88733149	3.612584
270	6.25	4.896854	4.753395	0	-1.353146	2.259438
270	3.142857	1.789711	6.543107	4.761905	3.40875871	5.668197
274	1.328038	-0.02511	6.517998	1.328038	-0.0251083	5.643088
274	0.661521	-0.69162	5.826374	1.433297	0.08015053	5.723239
274	0.331126	-1.02202	4.804353	0.165563	-1.1875831	4.535656
274	0.541028	-0.81212	3.992235	0.721371	-0.6317754	3.90388
274	3.896104	2.542958	6.535193	4.935065	3.58191889	7.485799
274	0	-1.35315	5.182047	0	-1.353146	6.132653
275	3.355705	2.002559	7.184606	1.006711	-0.3464346	5.786218
276	3.246753	1.893607	9.078213	0	-1.353146	4.433072
276	0	-1.35315	7.725067	0	-1.353146	3.079926
276	1.812298	0.459152	8.184219	2.200647	0.8475012	3.927428
276	0	-1.35315	6.831073	0	-1.353146	2.574282
279	0	-1.35315	5.477927	0	-1.353146	1.221135
282	0	-1.35315	4.124781	0	-1.353146	-0.13201
284	1.808176	0.45503	4.579811	1.336478	-0.0166681	-0.14868
285	0.057307	-1.29584	3.283971	0.057307	-1.2958395	-1.44452
289	0.765996	-0.58715	2.696821	1.27666	-0.0764864	-1.521
294	1.466544	0.113398	2.810219	0.91659	-0.4365558	-1.95756
294	1.179941	-0.17321	2.637014	1.179941	-0.173205	-2.13077
296	0.337838	-1.01531	1.621706	0.399263	-0.9538831	-3.08465
309	0.483384	-0.86976	0.751944	0.181269	-1.1718772	-4.25653
309	0.601202	-0.75194	-6.8E-18	0.200401	-1.1527452	-5.40927
mean	1.353146			1.178653		
sd	1.706378			1.770556		
n	39			31		
error	0.273239			0.318001		

Claudius II Rome Mint UK hoards

DATE OF LAST COIN	ROME % Issue 2	diff from mean	cusum of diff	ROME % Issue 3	diff from mean	cusum of diff	ROME % Issue 4	diff from mean	cusum of diff
261									
261									
263									
264									
267									
267									
269	0	-3.49948	-3.49948	0	-1.48311	-1.48311			
270	0.092251	-3.40723	-6.9067	0	-1.48311	-2.96622	0	-0.80054	-0.80054
270	0	-3.49948	-10.4062	0	-1.48311	-4.44933	0	-0.80054	-1.60107
270	0	-3.49948	-13.9057	0	-1.48311	-5.93244	0	-0.80054	-2.40161
270	0.110619	-3.38886	-17.2945	0	-1.48311	-7.41555	0.110619	-0.68992	-3.09152
271	0.509879	-2.9896	-20.2841	0	-1.48311	-8.89866	0.12747	-0.67307	-3.76459
271	4.705882	1.206408	-19.0777	2.352941	0.869831	-8.02863	0.588235	-0.2123	-3.97689
273	5.207566	1.70809	-17.3696	1.328455	-0.15665	-8.18548	2.112503	1.311967	-2.66492
273	6.407767	2.908291	-14.4613	2.718447	1.235337	-6.95015	0.38835	-0.41219	-3.07711
273	4.566787	1.067311	-13.394	1.642599	0.159489	-6.79066	1.101083	0.300547	-2.77656
273	1.638201	-1.86127	-15.2553	0.45312	-1.02999	-7.82065	0.278843	-0.52169	-3.29826
273	1.474926	-2.02455	-17.2798	2.949853	1.466743	-6.35391	0	-0.80054	-4.09879
273	3.472222	-0.02725	-17.3071	0.694444	-0.78867	-7.14257	2.777778	1.977242	-2.12155
273							2.587519	1.786983	-0.33457
273	6.486146	2.98667	-14.3204	2.455919	0.972809	-6.16976	1.448363	0.647827	0.313258
273	5.353956	1.85448	-12.4659	1.249258	-0.23385	-6.40362	1.427722	0.627186	0.940444
274	14.7541	11.25462	-1.21131	4.918033	3.434923	-2.96869	3.278689	2.478153	3.418597
274	8.502024	5.002548	3.791234	1.619433	0.136323	-2.83237	2.226721	1.426185	4.844781
274	3.945481	0.446005	4.237239	1.147776	-0.33533	-3.1677	1.07604	0.275504	5.120285
274	6.142241	2.642765	6.880004	1.400862	-0.08225	-3.24995	0.646552	-0.15398	4.966301
274	1.923077	-1.5764	5.303605	1.282051	-0.20106	-3.45101	0	-0.80054	4.165765
274	1.797965	-1.70151	3.602094	0.529563	-0.95355	-4.40456	0.394897	-0.40564	3.760126
274	2.177554	-1.32192	2.280173	2.512563	1.029453	-3.3751	0.502513	-0.29802	3.462103
274	2.492877	-1.0066	1.273574	0.641026	-0.84208	-4.21719	0.14245	-0.65809	2.804017
274	4.918033	1.418557	2.692131	3.278689	1.795579	-2.42161	1.639344	0.838808	3.642825
276	3.387827	-0.11165	2.580483	1.319677	-0.16343	-2.58504	0.728777	-0.07176	3.571066
277	2.754237	-0.74524	1.835244	0.423729	-1.05938	-3.64442	0.423729	-0.37681	3.194259
279	3.401689	-0.09779	1.737457	1.133896	-0.34921	-3.99364	0.482509	-0.31803	2.876232
280	3.921569	0.422093	2.159549	2.113573	0.830463	-3.36318	1.196842	0.396306	3.272538
281	2.10879	-1.39069	0.768863	0.748916	-0.73419	-4.09737	0.453291	-0.34724	2.925294
281	3.61787	0.118394	0.887258	1.467748	-0.01536	-4.11273	0.682374	-0.11816	2.807132
281	2.751159	-0.74832	0.138941	0.896445	-0.58666	-4.6994	0.463679	-0.33686	2.470274
281	3.589921	0.090445	0.229385	0.931999	-0.55111	-5.25051	0.724888	-0.07565	2.394626
281	3.62167	0.122194	0.35158	1.077522	-0.40559	-5.6561	0.882969	0.082433	2.477059
282	3.211009	-0.28847	0.063113	1.802097	0.318987	-5.33711	0.42595	-0.37459	2.102474
282	3.192796	-0.30668	-0.24357	2.333197	0.850087	-4.48702	0.532133	-0.2684	1.83407
282	4.910381	1.410905	1.167337	1.512323	0.029213	-4.45781	0.765497	-0.03504	1.799031
282	0.858124	-2.64135	-1.47401	4.319222	2.836112	-1.6217	1.258581	0.458045	2.257076
282	0	-3.49948	-4.97349	0	-1.48311	-3.10481	0	-0.80054	1.45654
282	3.712486	0.21301	-4.76048	1.667284	0.184174	-2.92063	0.733605	-0.06693	1.389609
282	1.973684	-1.52579	-6.28627	0.986842	-0.49627	-3.4169	0.657895	-0.14264	1.246968
284	3.164801	-0.33467	-6.62095	0.771903	-0.71121	-4.12811	0.733308	-0.06723	1.179739
286	4.760531	1.261055	-5.35989	1.731102	0.247992	-3.88012	0.923254	0.122718	1.302458
287	8	4.500524	-0.85937	0	-1.48311	-5.36323	0	-0.80054	0.501922
290	2.522731	-0.97674	-1.83611	1.096452	-0.38666	-5.74988	0.695311	-0.10522	0.396697
290	4.550293	1.050817	-0.7853	1.690705	0.207595	-5.54229	0.791083	-0.00945	0.387244
292	5.555556	2.05608	1.270784	2.777778	1.294668	-4.24762	1.023392	0.222856	0.6101
294	10.4712	6.971728	8.242512	9.947644	8.464534	4.216913	2.617801	1.817265	2.427365
296	0	-3.49948	4.743036	0	-1.48311	2.733803	0	-0.80054	1.626829
296	5.755396	2.25592	6.998955	1.715551	0.232441	2.966244	0.774765	-0.02577	1.601058
296	0	-3.49948	3.499479	0	-1.48311	1.483134	0	-0.80054	0.800522
340	0	-3.49948	3.4E-06	0	-1.48311	0.000024	0	-0.80054	-1.4E-05
mean	3.499476			1.48311			0.800536		
sd	2.901757			1.643213			0.796425		
n	51			51			51		
error	0.406327			0.230096			0.111522		

Claudius II Milan Mint UK hoards

DATE OF LAST COIN	MILAN % Issue 1	diff from mean	cusum of diff	MILAN % Issue 2	diff from mean	cusum of diff	MILAN % Issue 3	diff from mean	cusum of diff
261									
261									
263									
263									
264									
267									
267									
269	0	-0.4942	-0.4942	0	-0.41545	-0.41545			
270	0	-0.4942	-0.98841	0	-0.41545	-0.8309	0	-0.03727	-0.03727
270	0	-0.4942	-1.48261	0	-0.41545	-1.24635	0	-0.03727	-0.07453
270	0	-0.4942	-1.97682	0	-0.41545	-1.6618	0	-0.03727	-0.1118
270	0	-0.4942	-2.47102	0	-0.41545	-2.07725	0	-0.03727	-0.14906
271	0.063735	-0.43047	-2.90149	0	-0.41545	-2.4927	0	-0.03727	-0.18633
271	0	-0.4942	-3.39569	0.588235	0.172785	-2.31991	0	-0.03727	-0.22359
273	0.908868	0.414664	-2.98103	0.540408	0.124958	-2.19496	0.049128	0.011863	-0.21173
273	1.165049	0.670845	-2.31018	0.582524	0.167074	-2.02788	0	-0.03727	-0.24899
273	0.66787	0.173666	-2.13652	0.487365	0.071915	-1.95597	0.144404	0.107139	-0.14185
273	0.278843	-0.21536	-2.35188	0.348554	-0.0669	-2.02286	0.034855	-0.00241	-0.14426
273	0.884956	0.390752	-1.96113	0.294985	-0.12046	-2.14333	0	-0.03727	-0.18153
273	1.388889	0.894685	-1.06644	0.283333	1.667883	-0.47545	0	-0.03727	-0.21879
273	1.065449	0.571245	-0.4952	0.608828	0.193378	-0.28207	0	-0.03727	-0.25606
273	0.944584	0.45038	-0.04482	0.440806	0.025356	-0.25671	0.188917	0.151652	-0.10441
273	0.892326	0.398122	0.353304	0.475907	0.060457	-0.19625	0.059488	0.022223	-0.08218
274	3.278689	2.784485	3.137788	4.918033	4.502583	4.306328	0	-0.03727	-0.11945
274	2.024291	1.530087	4.667876	1.214575	0.799125	5.105453	0	-0.03727	-0.15671
274	0.430416	-0.06379	4.604088	0.430416	0.014966	5.120419	0.071736	0.034471	-0.12224
274	0.215517	-0.27869	4.325401	0.323276	-0.09217	5.028245	0	-0.03727	-0.15951
274	0.641026	0.146822	4.472223	0.641026	0.225576	5.253821	0	-0.03727	-0.19677
274	0.236574	-0.25763	4.214593	0.174701	-0.24075	5.013072	0.014558	-0.02271	-0.21948
274	0.335008	-0.1592	4.055398	0.167504	-0.24795	4.765126	0	-0.03727	-0.25674
274	0	-0.4942	3.561194	0	-0.41545	4.349676	0	-0.03727	-0.29401
274	0	-0.4942	3.06699	0	-0.41545	3.934226	0	-0.03727	-0.33127
276	0.512113	0.017909	3.084899	0.53181	0.11636	4.050586	0.11818	0.080915	-0.25036
277	0	-0.4942	2.590695	0	-0.41545	3.635136	0	-0.03727	-0.28762
279	0.386007	-0.1082	2.482498	0.144753	-0.2707	3.364439	0.072376	0.035111	-0.25251
280	0.814871	0.320687	2.803166	0.509295	0.093845	3.458283	0.025465	-0.0118	-0.26431
281	0.275916	-0.21829	2.584878	0.473	0.05755	3.515833	0.059125	0.02186	-0.24245
281	0.399125	-0.09508	2.489799	0.411999	-0.00345	3.512382	0.103	0.065735	-0.17672
281	0.370943	-0.12326	2.366537	0.216383	-0.19907	3.313316	0.061824	0.024559	-0.15218
281	0.44874	-0.04546	2.321074	0.345185	-0.07027	3.24305	0.241629	0.204384	0.052206
281	0.688417	0.194213	2.515286	0.434002	0.018552	3.261802	0.089793	0.052528	0.104735
282	0.42595	-0.06825	2.447032	0.327654	-0.0878	3.173806	0.088296	0.061031	0.165768
282	0.532133	0.037929	2.484961	0.204666	-0.21078	2.963023	0	-0.03727	0.128501
282	0.410754	-0.08345	2.401511	0.354742	-0.06071	2.902315	0.056012	0.018747	0.147248
282	0.48627	-0.00793	2.393577	0.286041	-0.12941	2.772906	0.085812	0.048547	0.195795
282	0	-0.4942	1.899373	0	-0.41545	2.357456	0	-0.03727	0.15853
282	0.355687	-0.13852	1.760857	0.414969	-0.00048	2.356975	0.066691	0.029426	0.187957
282	0.986842	0.492638	2.253495	0.328947	-0.0865	2.270472	0	-0.03727	0.150692
284	0.501737	0.007533	2.261028	0.617522	0.202072	2.472544	0	-0.03727	0.113427
286	0.34622	-0.14798	2.113044	0.692441	0.276991	2.749535	0.057703	0.020438	0.133865
287	0	-0.4942	1.61884	0	-0.41545	2.334085	0	-0.03727	0.0966
290	0.289713	-0.20449	1.414349	0.329827	-0.08562	2.248462	0.066857	0.029592	0.126192
290	0.436244	-0.05796	1.356389	0.438331	0.022881	2.271343	0.079317	0.042052	0.168244
292	0.146199	-0.34801	1.008383	0	-0.41545	1.855893	0	-0.03727	0.130979
294	0	-0.4942	0.514179	0	-0.41545	1.440443	0	-0.03727	0.093714
296	0	-0.4942	0.019975	0	-0.41545	1.024993	0	-0.03727	0.056449
296	0.387382	-0.10682	-0.08685	0.221361	-0.19409	0.830904	0.05534	0.018075	0.074524
296	1.075269	0.581065	0.494219	0	-0.41545	0.415454	0	-0.03727	0.037259
340	0	-0.4942	0.000015	0	-0.41545	4.4E-06	0	-0.03727	-5.6E-06
mean	0.494204			0.41545			0.037265		
sd	0.581956			0.729767			0.05371		
n	52			52			51		
error	0.080703			0.1012			0.007521		

DIVO CLAUDIO & Quintillus Rome Mint UK hoards

DATE OF LAST COIN	QUINTILLUS			DIVO CLAUD		
	% QUINT Rome	diff from mean	cusum of diff	% DC Rome	diff from mean	cusum of diff
261						
261						
263						
263						
264						
267						
267						
269						
270	0	-1.03871	-1.03871	0	-0.97362	-0.97362
270	0	-1.03871	-2.07741	0	-0.97362	-1.94724
270	0	-1.03871	-3.11612	0	-0.97362	-2.92086
270	0	-1.03871	-4.15483	0	-0.97362	-3.89448
271	0.12747	-0.91124	-5.06607	0.12747	-0.84615	-4.74063
271	2.352941	1.314234	-3.75183	0	-0.97362	-5.71425
273	1.842299	0.803592	-2.94824	1.10538	0.13176	-5.58249
273	1.165049	0.126342	-2.8219	0.582524	-0.3911	-5.97359
273	0.884477	-0.15423	-2.97613	0.902527	-0.07109	-6.04468
273	0.45312	-0.58559	-3.56172	0.069711	-0.90391	-6.94859
273	0	-1.03871	-4.60042	0.884956	-0.08866	-7.03725
273	0.694444	-0.34426	-4.94468	1.388889	0.415269	-6.62198
273	0.608828	-0.42988	-5.37456	0.608828	-0.36479	-6.98678
273	2.455919	1.417212	-3.95735	0.566751	-0.40687	-7.39365
273	1.546698	0.507991	-3.44936	1.011303	0.037683	-7.35596
274	0	-1.03871	-4.48807	4.918033	3.944413	-3.41155
274	4.048583	3.009876	-1.47819	2.024291	1.050671	-2.36088
274	1.07604	0.037333	-1.44086	1.004304	0.030684	-2.33019
274	0	-1.03871	-2.47956	1.831897	0.858277	-1.47192
274	2.564103	1.525396	-0.95417	0.641026	-0.33259	-1.80451
274	0.291168	-0.74754	-1.70171	0.09099	-0.88283	-2.68714
274	0.167504	-0.8712	-2.57291	0.167504	-0.80612	-3.49326
274	0.14245	-0.89626	-3.46917	0.42735	-0.54627	-4.03953
274	0	-1.03871	-4.50787	1.639344	0.665724	-3.3738
276	0.925744	-0.11296	-4.62084	0.393933	-0.57969	-3.95349
277	0.635593	-0.40311	-5.02395	1.059322	0.085702	-3.86779
279	0.434258	-0.60445	-5.6284	1.59228	0.61866	-3.24913
280	0.738477	-0.30023	-5.92863	0.713012	-0.26061	-3.50974
281	0.35475	-0.68396	-6.61259	0.689791	-0.28383	-3.79356
281	0.849749	-0.18896	-6.80155	0.708124	-0.2655	-4.05906
281	0.741886	-0.29682	-7.09837	0.803709	-0.16991	-4.22897
281	0.621332	-0.41737	-7.51574	1.104591	0.130971	-4.098
281	0.77821	-0.2605	-7.77624	0.493864	-0.47976	-4.57776
282	0.688073	-0.35063	-8.12687	0.8519	-0.12172	-4.69948
282	0.777732	-0.26097	-8.38785	1.350798	0.377178	-4.3223
282	0.57879	-0.45992	-8.84776	0.970874	-0.00275	-4.32504
282	1.201373	0.162666	-8.6851	1.029748	0.056128	-4.26891
282	0	-1.03871	-9.7238	0	-0.97362	-5.24253
282	0.829937	-0.20877	-9.93257	1.645054	0.671434	-4.5711
282	0.657895	-0.38081	-10.3134	1.973684	1.000084	-3.57104
284	0.771903	-0.2668	-10.5802	1.235044	0.261424	-3.30961
286	0.663589	-0.37512	-10.9553	0.692441	-0.28118	-3.59079
287	0	-1.03871	-11.994	4	3.02638	-0.56441
290	0.615083	-0.42362	-12.4176	0.361027	-0.61259	-1.177
290	0.684631	-0.35408	-12.7717	1.081216	0.107596	-1.06941
292	0.584795	-0.45391	-13.2256	2.046784	1.073164	0.003755
294	1.570681	0.531974	-12.6937	0.52356	-0.45006	-0.4463
296	16.12903	15.09033	2.396671	0	-0.97362	-1.41992
296	0.719424	-0.31928	2.077389	2.490315	1.516695	0.096771
296	0	-1.03871	1.038682	1.075269	0.101649	0.19842
340	0	-1.03871	-2.5E-05	0.775194	-0.19843	-6.4E-06
mean	1.038707			0.97362		
sd	2.295731			0.945888		
n	51			51		
error	0.321467			0.132451		

Claudius II Rome Mint French hoards

DATE OF LAST COIN	ROME % Issue 2	diff from mean	cusum of diff	ROME % Issue 3	diff from mean	cusum of diff	ROME % Issue 4	diff from mean	cusum of diff
261									
262									
262									
262									
263									
263									
266									
266									
268	0	-6.32198	-6.32198						
269	0	-6.32198	-12.644	0	-1.52139	-1.52139			
270	0.030894	-6.29129	-18.9352	0	-1.52139	-3.04279	0	-0.75878	-0.75878
270	3.875969	-2.44601	-21.3813	0	-1.52139	-4.56418	0	-0.75878	-1.51757
270	27.05944	20.73746	-0.64381	0	-1.52139	-6.08558	0	-0.75878	-2.27635
270	18.75	12.42802	11.78421	0	-1.52139	-7.60697	0	-0.75878	-3.03513
270	3.126777	-3.1952	8.589009	0.113701	-1.40769	-9.01466	0	-0.75878	-3.79392
270	3.619048	-2.70293	5.886076	0.285714	-1.23568	-10.2503	0.190476	-0.56831	-4.36222
270	10.18182	3.859837	9.745913	0.363636	-1.15776	-11.4081	0.181818	-0.57696	-4.93919
270	0	-6.32198	3.423932	0	-1.52139	-12.9295	0	-0.75878	-5.69797
274	5.622933	-0.69905	2.724884	2.315325	0.793931	-12.1356	0.441014	-0.31777	-6.01574
274	4.304636	-2.01735	0.707538	0.331126	-1.19027	-13.3258	0.496689	-0.26209	-6.27783
274	6.118903	-0.20308	0.50446	2.085143	0.563749	-12.7621	0.657813	-0.10097	-6.3788
274	3.877367	-2.44461	-1.94015	1.172227	-0.34917	-13.1112	0.631199	-0.12758	-6.50639
274	7.407407	1.085426	-0.85473	3.703704	2.18231	-10.9289	0	-0.75878	-7.26517
274	6.753247	0.431266	-0.42346	0.779221	-0.74217	-11.6711	0	-0.75878	-8.02395
275	10.40268	4.080704	3.657242	8.389262	6.867868	-4.80324	4.362416	3.603633	-4.42032
276	0	-6.32198	-2.66474	0.851064	-0.67033	-5.47357	0	-0.75878	-5.1791
276	0	-6.32198	-8.98672	0.162206	-1.35919	-6.83276	0	-0.75878	-5.93789
276	8.608414	2.286433	-6.70029	1.294498	-0.2269	-7.05966	1.553398	0.794615	-5.14327
276	7.142857	0.820876	-5.87941	0.849351	-0.87204	-7.9317	1.948052	1.189269	-3.954
279	0	-6.32198	-12.2014	0	-1.52139	-9.4531	0	-0.75878	-4.71278
282	4.042589	-2.27939	-14.4808	1.646981	0.125587	-9.32751	0.582266	-0.17652	-4.8893
284	7.232704	0.910723	-13.5701	1.965409	0.444015	-8.88349	0.628931	-0.12985	-5.01915
285	0.17192	-6.15006	-19.7201	0	-1.52139	-10.4049	0.057307	-0.70148	-5.72063
289	16.3863	10.06432	-9.6558	5.797537	4.276143	-6.12875	2.718534	1.959751	-3.76088
294	13.84051	7.518532	-2.13727	3.941338	2.419944	-3.7088	1.649863	0.89108	-2.8698
294	13.27434	6.952355	4.815087	3.244838	1.723444	-1.98536	2.654867	1.896084	-0.97371
296	8.691646	2.389665	7.184752	3.685504	2.16411	0.178752	2.42629	1.667507	0.693792
309	3.655589	-2.66639	4.51836	1.661631	0.140237	0.31899	0.422961	-0.33582	0.35797
309	1.803607	-4.51837	-1.4E-05	1.202405	-0.31899	4.0E-07	0.400802	-0.35798	-1.2E-05
mean	6.321981			1.521394			0.758783		
sd	6.376822			1.978957			1.102086		
n	31			30			29		
error	1.145311			0.361307			0.204652		

Claudius II Milan Mint French hoards

DATE LAST OCIN	MILAN% issue 1	diff from mean	cusum of diff	MILAN% issue 2	diff from mean	cusum of diff	MILAN% issue 3	diff from mean	cusum of diff
261									
262									
262									
262									
263									
263									
266									
266									
268	0	-1.23819	-1.23819						
269	0	-1.23819	-2.47638	0	-0.80559	-0.80559			
270	0.030694	-1.2075	-3.68388	0	-0.80559	-1.61118	0	-0.07501	-0.07501
270	0	-1.23819	-4.92207	0	-0.80559	-2.41676	0	-0.07501	-0.15002
270	21.06361	19.82542	14.90335	2.606882	1.801294	-0.61547	0	-0.07501	-0.22503
270	0	-1.23819	13.66516	0	-0.80559	-1.42106	0	-0.07501	-0.30004
270	1.250711	0.012521	13.67768	0.227402	-0.57819	-1.99924	0	-0.07501	-0.37505
270	1.52381	0.28562	13.9633	0.761905	-0.04368	-2.04293	0	-0.07501	-0.45008
270	1.636364	0.398174	14.36148	1.636364	0.830776	-1.21215	0.181818	0.106808	-0.34325
270	0	-1.23819	13.12329	2.272727	1.467139	0.254988	0	-0.07501	-0.41826
274	0.551268	-0.68692	12.43636	0.882029	0.076441	0.331428	0.441014	0.366004	-0.05226
274	0	-1.23819	11.19817	0.496689	-0.3089	0.022529	0	-0.07501	-0.12727
274	0.819163	-0.41903	10.77915	1.278391	0.472803	0.495333	0.198585	0.123575	-0.00369
274	0.270514	-0.96768	9.811471	0.270514	-0.53507	-0.03974	0	-0.07501	-0.0787
274	0	-1.23819	8.573281	3.703704	2.898116	2.858374	0	-0.07501	-0.15371
274	1.818182	0.579992	9.153273	1.038961	0.233373	3.091747	0.25974	0.18473	0.031018
275	1.342282	0.104092	9.257364	1.006711	0.201123	3.292871	0	-0.07501	-0.04399
276	0	-1.23819	8.019174	0	-0.80559	2.487283	0	-0.07501	-0.119
276	0	-1.23819	6.780984	0	-0.80559	1.681695	0	-0.07501	-0.19401
276	0.906149	-0.33204	6.448943	0.711974	-0.09361	1.588081	0.12945	0.05444	-0.13957
276	1.298701	0.060511	6.509455	0.649351	-0.15624	1.431844	0	-0.07501	-0.21458
279	0	-1.23819	5.271265	0	-0.80559	0.626256	0	-0.07501	-0.28959
282		-1.23819	4.033075		-0.80559	-0.17933			
284	1.022013	-0.21618	3.816897	0.86478	0.059192	-0.12014	0.235849	0.160839	-0.12875
285	0	-1.23819	2.578707	0.057307	-0.74828	-0.86842	0	-0.07501	-0.20376
289	1.066386	-0.1718	2.406903	1.141484	0.335896	-0.53253	0.225293	0.150283	-0.05348
294	1.191567	-0.04662	2.360281	1.741522	0.935934	0.403407	0.274977	0.199967	0.146487
294	0.589971	-0.64822	1.712061	0.589971	-0.21562	0.18779	0	-0.07501	0.071477
296	0.552826	-0.68536	1.026697	0.890663	0.085075	0.272865	0.153563	0.078553	0.150029
309	0.21148	-1.02671	-1.3E-05	0.332326	-0.47326	-0.2004	0	-0.07501	0.075019
309	0	-1.23819	-1.2382	0.200401	-0.60519	-0.80558	0	-0.07501	9.4E-06
mean	1.23819			0.805588			0.07501		
sd	3.735835			0.889171			0.120219		
n	30			29			28		
error	0.682067			0.165115			0.022719		

DIVO CLAUDIO and Quintillus Rome Mint French hoards

DATE OF LAST COIN	QUINTILLUS			DIVO CLAUD		
	% QUINT Rome	diff from mean	cusum of diff	% DC Rome	diff from mean	cusum of diff
261						
262						
262						
263						
263						
266						
266						
268						
269						
270	0	-0.90787	-0.90787	0	-1.40921	-1.40921
270	0	-0.90787	-1.81575	0	-1.40921	-2.81842
270	0	-0.90787	-2.72362	0	-1.40921	-4.22762
270	6.25	5.342126	2.618504	0	-1.40921	-5.63683
270	0	-0.90787	1.71063	0	-1.40921	-7.04604
270	0.095238	-0.81264	0.897994	0	-1.40921	-8.45525
270	0	-0.90787	-0.00988	0	-1.40921	-9.86446
270	0	-0.90787	-0.91775	0	-1.40921	-11.2737
274	1.212789	0.304915	-0.61284	1.54355	0.134342	-11.1393
274	0	-0.90787	-1.52071	0.827815	-0.58139	-11.7207
274	0.79434	-0.11353	-1.63425	0.248231	-1.16098	-12.8817
274	0.541028	-0.36685	-2.00109	3.606853	2.197645	-10.884
274	0	-0.90787	-2.90897	0	-1.40921	-12.0933
274	0.25974	-0.64813	-3.5571	0	-1.40921	-13.5025
275	1.677852	0.769978	-2.78712	3.355705	1.946497	-11.556
276	0	-0.90787	-3.695	1.276596	-0.13261	-11.6886
276	0	-0.90787	-4.60287	0.973236	-0.43597	-12.1246
276	1.423948	0.516074	-4.0868	0.582524	-0.82668	-12.9512
276	3.896104	2.98823	-1.09857	0.649351	-0.75986	-13.7111
279	2.941176	2.033302	0.934737	0	-1.40921	-15.1203
282						
284	0.314465	-0.59341	0.341328	1.257862	-0.15135	-15.2716
285	0	-0.90787	-0.56655	0.114613	-1.29459	-16.5662
289	1.862421	0.954547	0.388002			
294	1.374885	0.467011	0.855013	1.649863	0.240655	-16.3256
294	1.179941	0.272067	1.12708	8.554572	7.145364	-9.18022
296	1.566339	0.658465	1.785545	10.59582	9.186615	0.006393
309	0.030211	-0.87766	0.907883			
309	0	-0.90787	8.5E-06	1.402806	-0.0064	-9.2E-06
mean	0.907874			1.409208		
sd	1.429637			2.508441		
n	28			26		
error	0.270176			0.491946		

Aurelian pre and post XXI reform radiates UK hoards

DATE OF LAST COIN	% rome pre ref	diff from mean	cusum of diff	% rome post ref	diff from mean	cusum of diff
261						
261						
263						
263						
264						
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267						
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270						
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270						
270						
271	0	-0.09262	-0.09262			
271	0	-0.09262	-0.18523			
273	0.024564	-0.06805	-0.25328			
273	0	-0.09262	-0.3459			
273	0.054152	-0.03846	-0.38436			
273	0	-0.09262	-0.47698			
273	0	-0.09262	-0.5696			
273	0	-0.09262	-0.66221			
273	0	-0.09262	-0.75483			
273	0.188917	0.096301	-0.65853			
273	0.178465	0.085849	-0.57268			
274	0	-0.09262	-0.66529	0	-0.00734	-0.00734
274	0	-0.09262	-0.75791	0	-0.00734	-0.01468
274	0.071736	-0.02088	-0.77879	0	-0.00734	-0.02202
274	0	-0.09262	-0.87141	0	-0.00734	-0.02936
274	0	-0.09262	-0.96402	0	-0.00734	-0.03671
274	0.005459	-0.08716	-1.05118	0	-0.00734	-0.04405
274	0	-0.09262	-1.14379	0	-0.00734	-0.05139
274	0	-0.09262	-1.23641	0	-0.00734	-0.05873
274	0	-0.09262	-1.32903	0	-0.00734	-0.06607
276	0.039393	-0.05322	-1.38225	0	-0.00734	-0.07341
277	0.423729	0.331113	-1.05114	0	-0.00734	-0.08075
279	0.144753	0.052137	-0.999	0	-0.00734	-0.08809
280	0.050929	-0.04169	-1.04069	0	-0.00734	-0.09543
281	0.078833	-0.01378	-1.05447	0.019708	0.012367	-0.08307
281	0.07725	-0.01537	-1.06984	0.02575	0.018409	-0.06466
281	0.030912	-0.0617	-1.13154	0	-0.00734	-0.072
281	0.138074	0.045458	-1.08608	0	-0.00734	-0.07934
281	0.119725	0.027109	-1.05897	0	-0.00734	-0.08668
282	0.131062	0.038446	-1.02053	0	-0.00734	-0.09402
282	0.040933	-0.05168	-1.07221	0	-0.00734	-0.10136
282	0.056012	-0.0366	-1.10881	0	-0.00734	-0.1087
282	0.143021	0.050405	-1.05841	0.028604	0.021263	-0.08744
282	0	-0.09262	-1.15103	0	-0.00734	-0.09478
282	0.029641	-0.06298	-1.214	0.00741	0.000069	-0.09471
282	0	-0.09262	-1.30662	0	-0.00734	-0.10205
284	0	-0.09262	-1.39923	0.038595	0.031254	-0.0708
286	0.17311	0.080494	-1.31874	0.028852	0.021511	-0.04929
287	0	-0.09262	-1.41135	0	-0.00734	-0.05663
290	0.124799	0.032183	-1.37917	0.057943	0.050802	-0.00603
290	0.073055	-0.01956	-1.39873	0.002087	-0.00525	-0.01128
292	0.292398	0.199782	-1.19895	0	-0.00734	-0.01862
294	0.52356	0.430944	-0.76801	0	-0.00734	-0.02596
296	0.806452	0.713836	-0.05417	0	-0.00734	-0.0333
296	0.332042	0.239426	0.185255	0.05534	0.047999	0.014696
296	0	-0.09262	0.092639	0	-0.00734	0.007355
340	0	-0.09262	0.000023	0	-0.00734	0.000014
	0.092616			0.007341		
	0.157336			0.015794		
	47			36		
	0.02295			0.002632		

Aurelian pre and post XXI reform radiates UK hoards

DATE OF LAST COIN	% rome pre ref	diff from mean	cusum of diff	% rome post ref	diff from mean	cusum of diff
261						
262						
262						
263						
263						
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270						
274	0.110254	-0.11602	-0.11602	0	-0.19588	-0.19588
274	0	-0.22628	-0.3423	0	-0.19588	-0.39177
274	0.090171	-0.13611	-0.47841	0	-0.19588	-0.58765
274	0	-0.22628	-0.70468	0	-0.19588	-0.78354
274	0	-0.22628	-0.93096	0	-0.19588	-0.97942
274	0.024823	-0.20145	-1.13241	0	-0.19588	-1.1753
275	0	-0.22628	-1.35869	0	-0.19588	-1.37119
276	0	-0.22628	-1.58497	0	-0.19588	-1.56707
276	0.12945	-0.09683	-1.6818	0	-0.19588	-1.76296
276	0	-0.22628	-1.90807	0	-0.19588	-1.95884
276	0	-0.22628	-2.13435	0	-0.19588	-2.15472
279	0	-0.22628	-2.36063	0	-0.19588	-2.35061
284	0.157233	-0.06904	-2.42967	0.078616	-0.11727	-2.46788
285	2.52149	2.295213	-0.13446	2.464183	2.268299	-0.19958
289	0.345449	0.119172	-0.01529	0.210273	0.014389	-0.18519
294	0.183318	-0.04296	-0.05824	0.091659	-0.10422	-0.28941
294	0.294985	0.068708	0.010464	0.294985	0.099101	-0.19031
309	0.200401	-0.02588	-0.01541	0.400802	0.204918	0.014607
309	0.241692	0.015415	2.6E-06	0.181269	-0.01462	-8.1E-06
	0.226277			0.195884		
	0.566961			0.561866		
	19			19		
	0.13007			0.128901		

Postumus Mint 1 UK hoards

DATE LAST COIN	% Issue 1	diff from mean	cusum of diff	% Issue 2	diff from mean	cusum of diff
261	0.272727	-3.5412	-3.5412			
261	6.10687	2.292939	-1.24826			
263	19.50368	15.68975	14.44149	2.05506	0.729356	0.729356
263	12.98701	9.173082	23.61457	3.896104	2.5704	3.299756
264	21.53846	17.72453	41.3391	1.538462	0.212758	3.512514
265	6.666667	2.852736	44.19184	0	-1.3257	2.18681
267	13.35312	9.539185	53.73102	2.670623	1.344919	3.531729
267	14.43299	10.61906	64.35008	11.34021	10.0145	13.54623
268	9.864482	6.050551	70.40063	8.383234	7.05753	20.60376
270	9.62963	5.815699	76.21633	7.160494	5.83479	26.43855
270	6.666667	2.852736	79.06906	0	-1.3257	25.11285
270	0.276753	-3.53718	75.53189	0.369004	-0.9567	24.15615
270	11.76471	7.950775	83.48266	1.960784	0.63508	24.79123
270	18.58407	14.77014	98.2528	8.29646	6.970756	31.76198
270	8.641975	4.828044	103.0808	1.234568	-0.09114	31.67085
270	7.647059	3.833128	106.914	0.588235	-0.73747	30.93338
271	12.08054	8.266606	115.1806	1.342282	0.016578	30.94996
271	7.775653	3.961722	119.1423	7.010835	5.685131	36.63509
272	17.3913	13.57737	132.7197	4.830918	3.505214	40.1403
272	5.128205	1.314274	134.0339	0	-1.3257	38.8146
273	2.135922	-1.67801	132.3559	0.582524	-0.74318	38.07142
273	0	-3.81393	128.542	0	-1.3257	36.74571
273	10.35565	6.541718	135.0837	2.336123	1.010419	37.75613
273	3.02267	-0.79126	134.2925	0.881612	-0.44409	37.31204
273	0	-3.81393	130.4785	0	-1.3257	35.98634
273	0.608828	-3.2051	127.2734	0	-1.3257	34.66063
273	3.472222	-0.34171	126.9317	1.388889	0.063185	34.72382
273	0.306859	-3.50707	123.4247	0.090253	-1.23545	33.48836
274	0	-3.81393	119.6107	0.330033	-0.99567	32.49269
274	0.213675	-3.60026	116.0105	0.071225	-1.25448	31.23822
274	0	-3.81393	112.1965	0	-1.3257	29.91251
274	4.854369	1.040438	113.237	0	-1.3257	28.58681
274	0	-3.81393	109.423	0	-1.3257	27.2611
274	3.517588	-0.29634	109.1267	0.670017	-0.65569	26.60542
274	4.612546	0.798615	109.9253	0.830258	-0.49545	26.10997
274	0	-3.81393	106.1114	8.333333	7.007629	33.1176
274	5.062878	1.248947	107.3603	3.168382	1.842678	34.96028
274	2.223816	-1.59011	105.7702	1.291248	-0.03446	34.92582
274	11.18133	7.367399	113.1376	2.167024	0.84132	35.76714
274	3.205128	-0.6088	112.5288	0	-1.3257	34.44144
274	1.890924	-1.92301	110.6058	0.457803	-0.8679	33.57354
274	0.35693	-3.457	107.1488	0	-1.3257	32.24783
274	0	-3.81393	103.3349	0	-1.3257	30.92213
274	0	-3.81393	99.52094	0	-1.3257	29.59642
274	0.920502	-2.89343	96.62751	0.355649	-0.97006	28.62637
274	0	-3.81393	92.81358	0.746269	-0.57944	28.04693
274	1.756587	-2.05734	90.75624	0.878294	-0.44741	27.59952
274	4.814815	1.000884	91.75712	2.222222	0.896518	28.49604
274	0	-3.81393	87.94319	0	-1.3257	27.17034
274	2.573529	-1.2404	86.70279	1.348039	0.022335	27.19267
274	2.176166	-1.63777	85.06502	0.207254	-1.11845	26.07422
274	4.480956	0.667025	85.73205	2.725915	1.400211	27.47443

Postumus Mint I UK hoards continued

274	3.754266	-0.05966	85.67238	0.455063	-0.87064	26.60379
277	2.118644	-1.69529	83.9771	0.635593	-0.69011	25.91368
279	0.024125	-3.78981	80.18729	0.024125	-1.30158	24.6121
280	0.081268	-3.73266	76.45463	0	-1.3257	23.2864
280	0	-3.81393	72.6407	0	-1.3257	21.96069
280	0.101859	-3.71207	68.92862	0	-1.3257	20.63499
281	0.344208	-3.46972	65.4589	0.149656	-1.17605	19.45894
281	0.123648	-3.69028	61.76862	0	-1.3257	18.13324
281	0.039417	-3.77451	57.9941	0	-1.3257	16.80753
281	0.038625	-3.77531	54.2188	0	-1.3257	15.48183
281	0.138074	-3.67586	50.54294	0	-1.3257	14.15613
282	0	-3.81393	46.72901	0	-1.3257	12.83042
282	0.1228	-3.69113	43.03788	0.040933	-1.28477	11.54565
282	4.480956	0.667025	43.7049	2.725915	1.400211	12.94586
282	0	-3.81393	39.89097	0	-1.3257	11.62016
282	0.065531	-3.7484	36.14257	0	-1.3257	10.29445
282	1.144165	-2.66977	33.47281	0.400458	-0.92525	9.369207
282	0.044461	-3.76947	29.70334	0.066691	-1.25901	8.110195
284	0.192976	-3.62096	26.08238	0.038595	-1.28711	6.823086
286	0.028852	-3.78508	22.2973	0	-1.3257	5.497382
289	0.020873	-3.79306	18.50424	0.006262	-1.31944	4.17794
289	0	-3.81393	14.69031	0	-1.3257	2.852236
292	0.292398	-3.52153	11.16878	0	-1.3257	1.526532
296	0	-3.81393	7.354847	2.419355	1.093651	2.620183
296	0.106971	-3.70696	3.647887	0.0312	-1.2945	1.325678
296	0.166021	-3.64791	-2.3E-05	0	-1.3257	-2.6E-05
	3.813931			1.325704		
	5.33626			2.366567		
	78			76		
	0.604213			0.271464		

Postumus Mint I UK hoards continued

DATE LAST COIN	% issue 3	diff from mean	cusum of diff	% issue 4	diff from mean	cusum of diff
261						
261						
263	0.310198	-3.37367	-3.37367			
263	5.194805	1.510936	-1.86274			
264	2.307692	-1.37618	-3.23891	0.769231	-0.90983	-0.90983
265	6.666667	2.982798	-0.25611	0	-1.67907	-2.5889
267	1.186944	-2.49693	-2.75304	0.593472	-1.08559	-3.67449
267	15.46392	11.78005	9.027009	6.185567	4.506502	0.83201
268	21.99811	18.31424	27.34125	8.068074	6.389009	7.221019
270	23.20988	19.52601	46.86726	8.395062	6.715997	13.93702
270	13.33333	9.649464	56.51672	6.666667	4.987602	18.92462
270	0.276753	-3.40712	53.1096	0.461255	-1.21781	17.70681
270	13.72549	10.04162	63.15123	7.843137	6.164072	23.87088
270	15.81858	12.13472	75.28594	5.309735	3.63067	27.50155
270	0	-3.68387	71.60207	1.234568	-0.4445	27.05705
270	14.11765	10.43378	82.03585	1.764706	0.085641	27.14269
271	6.040268	2.356399	84.39225	4.026846	2.347781	29.49047
271	21.09624	17.41237	101.8046	13.00191	11.32285	40.81332
272	14.97585	11.29198	113.0966	12.07729	10.39823	51.21155
272	2.564103	-1.11977	111.9768	0	-1.67907	49.53248
273	2.718447	-0.96542	111.0114	0.38835	-1.29072	48.24177
273	0	-3.68387	107.3275	0	-1.67907	46.5627
273	6.973501	3.289632	110.6172	4.149233	2.470168	49.03287
273	2.078086	-1.60578	109.0114	1.700252	0.021187	49.05406
273	0	-3.68387	105.3275	0	-1.67907	47.37499
273	0.456621	-3.22725	102.1003	0	-1.67907	45.69593
273	0	-3.68387	98.4164	0.694444	-0.98462	44.71131
273	0.288809	-3.39506	95.02134	0.072202	-1.60686	43.10445
274	0	-3.68387	91.33747	0	-1.67907	41.42538
274	0.14245	-3.54142	87.79605	0.071225	-1.60784	39.81754
274	0	-3.68387	84.11218	0	-1.67907	38.13848
274	0.970874	-2.713	81.39919	1.941748	0.262683	38.40116
274	0	-3.68387	77.71532	0	-1.67907	36.72209
274	1.507538	-2.17633	75.53899	0.837521	-0.84154	35.88055
274	2.306273	-1.3776	74.16139	0.738007	-0.94106	34.93949
274	0	-3.68387	70.47752	0	-1.67907	33.26043
274	7.055365	3.371496	73.84902	4.229953	2.550888	35.81131
274	2.797704	-0.88616	72.96285	1.362984	-0.31608	35.49523
274	5.363521	1.679652	74.64251	1.128391	-0.55067	34.94456
274	1.282051	-2.40182	72.24069	0.641026	-1.03804	33.90652
274	1.592357	-2.09151	70.14918	0.617038	-1.06203	32.84449
274	0.297442	-3.38643	66.76275	0.059488	-1.61958	31.22492
274	0.311042	-3.37283	63.38992	0.07776	-1.6013	29.62361
274	0	-3.68387	59.70605	0	-1.67907	27.94455
274	0.920502	-2.76337	56.94269	0.732218	-0.94685	26.9977
274	0	-3.68387	53.25882	0	-1.67907	25.31864
274	3.011292	-0.67258	52.58624	1.31744	-0.36162	24.95701
274	4.444444	0.760575	53.34682	1.481481	-0.19758	24.75943
274	9.090909	5.40704	58.75386	0	-1.67907	23.08036
274	3.676471	-0.0074	58.74646	1.593137	-0.08593	22.99443
274	2.072539	-1.61133	57.13513	2.797927	1.118862	24.1133
274	7.001494	3.317625	60.45275	4.238237	2.559172	26.67247

Postumus Mint I UK hoards continued

274	2.502844	-1.18102	59.27173	0.910125	-0.76894	25.90353
277	1.483051	-2.20082	57.07091	2.542373	0.863308	26.76684
279	0	-3.68387	53.38704	0.024125	-1.65494	25.1119
280	0.243803	-3.44007	49.94698	0.040634	-1.63843	23.47347
280	17.3913	13.70744	63.65441	4.347826	2.668761	26.14223
280	0.407436	-3.27643	60.37798	0.254647	-1.42442	24.71781
281	0.613589	-3.07028	57.3077	0.583658	-1.09541	23.6224
281	0.061824	-3.62205	53.68565	0	-1.67907	21.94334
281	0.11825	-3.56562	50.12003	0.059125	-1.61994	20.3234
281	0.1545	-3.52937	46.59066	0	-1.67907	18.64433
281	0.103555	-3.58031	43.01035	0.069037	-1.61003	17.0343
282	0	-3.68387	39.32648	0	-1.67907	15.35524
282	0.2456	-3.43827	35.88821	0.163733	-1.51533	13.83991
282	7.001494	3.317625	39.20584	4.238237	2.559172	16.39908
282	0.328947	-3.35492	35.85092	0	-1.67907	14.72002
282	0.032765	-3.6511	32.19981	0	-1.67907	13.04095
282	1.659039	-2.02483	30.17498	1.287185	-0.39188	12.64907
282	0.133383	-3.55049	26.6245	0.029641	-1.64942	10.99965
284	0.308761	-3.37511	23.24939	0.115785	-1.56328	9.436366
286	0	-3.68387	19.56552	0	-1.67907	7.757301
289	0.027135	-3.65673	15.90878	0.012524	-1.66654	6.09076
289	1.785714	-1.89815	14.01063	1.785714	0.106649	6.197409
292	0.584795	-3.09907	10.91156	0.438596	-1.24047	4.956941
296	0	-3.68387	7.227687	0	-1.67907	3.277876
296	0.084685	-3.59918	3.628503	0.080228	-1.59884	1.679039
296	0.05534	-3.62853	-2.6E-05	0	-1.67907	-2.6E-05
	3.683869			1.679065		
	5.822975			2.785304		
	76			74		
	0.667941			0.323785		

Postumus Mint I UK hoards continued

DATE LAST COIN	% issue 5	diff from mean	cusum of diff	% Issue 6	diff from mean	cusum of diff
261						
261						
263						
263						
264						
265						
267						
267						
268	2.017019	0.778722	0.778722	0	-1.07152	-1.07152
270	4.938272	3.699975	4.478696	5.925926	4.854409	3.782892
270	6.666667	5.42837	9.907066	0	-1.07152	2.711375
270	0.092251	-1.14605	8.76102	0.184502	-0.88702	1.82436
270	13.72549	12.48719	21.24821	1.960784	0.889267	2.713627
270	1.216814	-0.02148	21.22673	0.221239	-0.85028	1.863349
270	2.469136	1.230839	22.45757	0	-1.07152	0.791832
270	0.588235	-0.65006	21.80751	2.941176	1.869659	2.661491
271	2.013423	0.775126	22.58263	6.040268	4.968751	7.630243
271	5.481198	4.242901	26.82553	3.441683	2.370166	10.00041
272	6.763285	5.524988	32.35052	2.898551	1.827034	11.82744
272	0	-1.2383	31.11223	0	-1.07152	10.75593
273	0	-1.2383	29.87393	0.38835	-0.68317	10.07276
273	0	-1.2383	28.63563	0	-1.07152	9.001241
273	2.580195	1.341898	29.97753	2.998605	1.927088	10.92833
273	1.259446	0.021149	29.99868	2.518892	1.447375	12.3757
273	8	6.761703	36.76038	0	-1.07152	11.30419
273	0	-1.2383	35.52208	0.456621	-0.6149	10.68929
273	0.694444	-0.54385	34.97823	0	-1.07152	9.617774
273	0.198556	-1.03974	33.93849	0.451264	-0.62025	8.99752
274	0	-1.2383	32.70019	0.330033	-0.74148	8.256036
274	0	-1.2383	31.4619	0.213675	-0.85784	7.398195
274	0	-1.2383	30.2236	0	-1.07152	6.326678
274	0	-1.2383	28.9853	0.970874	-0.10064	6.226034
274	0	-1.2383	27.74701	0.502513	-0.569	5.65703
274	1.172529	-0.06577	27.68124	0.502513	-0.569	5.088025
274	0	-1.2383	26.44294	0	-1.07152	4.016508
274	0	-1.2383	25.20464	0	-1.07152	2.944991
274	1.518863	0.280566	25.48521	1.910828	0.839311	3.784302
274	0.932568	-0.30573	25.17948	2.797704	1.726187	5.51049
274	1.04596	-0.19234	24.98714	1.546042	0.474525	5.985015
274	1.282051	0.043754	25.0309	1.282051	0.210534	6.19555
274	0.497611	-0.74069	24.29021	1.632166	0.560649	6.756198
274	0.594884	-0.64341	23.6468	1.011303	-0.06021	6.695984
274	0.466563	-0.77173	22.87507	0.233281	-0.83824	5.857748
274	4	2.761703	25.63677	0	-1.07152	4.786231
274	0.564854	-0.67344	24.96333	0.8159	-0.25562	4.530614
274	0	-1.2383	23.72503	0	-1.07152	3.459097
274	2.195734	0.957437	24.68247	0.815558	-0.25596	3.203138
274	1.666667	0.42837	25.11084	0.925926	-0.14559	3.057547
274	0	-1.2383	23.87254	0	-1.07152	1.98603
274	2.083333	0.845036	24.71757	1.960784	0.889267	2.875298
274	1.139896	-0.0984	24.61917	0.518135	-0.55338	2.321915
274	1.512323	0.274026	24.8932	2.128454	1.056937	3.378852

Postumus Mint I UK hoards continued

274	0.910125	-0.32817	24.56503	2.502844	1.431327	4.81018
277	1.059322	-0.17897	24.38605	0.635593	-0.43592	4.374256
279	0.072376	-1.16592	23.22013	0.386007	-0.68551	3.688746
280	0.081268	-1.15703	22.0631	0.406339	-0.66518	3.023568
280	0	-1.2383	20.82481	0	-1.07152	1.952051
280	0.229183	-1.00911	19.81569	0.509295	-0.56222	1.389829
281	0.493864	-0.74443	19.07126	1.002694	-0.06882	1.321005
281	0.092736	-1.14556	17.9257	0.463679	-0.60784	0.713167
281	0.078833	-1.15946	16.76623	0.492708	-0.57881	0.134358
281	0.038625	-1.19967	15.56656	0.437749	-0.63377	-0.49941
281	0.034518	-1.20378	14.36278	0.414222	-0.6573	-1.15671
282	0	-1.2383	13.12449	3.886926	2.815409	1.658704
282	0.163733	-1.07456	12.04992	0.818666	-0.25285	1.405852
282	1.512323	0.274026	12.32395	1.811053	0.739536	2.145388
282	0	-1.2383	11.08565	0.657895	-0.41362	1.731766
282	0	-1.2383	9.847354	0.557012	-0.51451	1.217261
282	0.600686	-0.63761	9.209743	1.430206	0.358689	1.57595
282	0.059281	-1.17902	8.030728	0.570582	-0.50094	1.075014
284	0.115785	-1.12251	6.908216	0.849093	-0.22242	0.85259
286	0.086555	-1.15174	5.756474	0.721293	-0.35022	0.502366
289	0.029222	-1.20907	4.547399	0.528084	-0.54343	-0.04107
289	0	-1.2383	3.309102	0	-1.07152	-1.11258
292	0	-1.2383	2.070805	0.438596	-0.63292	-1.7455
296	1.612903	0.374606	2.445411	4.032258	2.960741	1.215237
296	0.0312	-1.2071	1.238314	0.374398	-0.69712	0.518118
296	0	-1.2383	0.000017	0.553403	-0.51811	4.8E-06
	1.238297			1.071517		
	2.290561			1.325891		
	70			70		
	0.273774			0.158474		

Postumus Mint 1 & Mint 2 UK hoards continued

DATE LAST COIN	% Issue 7	diff from mean	cusum of diff	% Mint 2, 1	diff from mean	cusum of diff
261						
261						
263						
263						
264						
265						
267						
267						
268				0	-0.21414	-0.21414
270	1.4814815	1.166631	1.166631			
270	0	-0.31485	0.851781	0	-0.21414	-0.42828
270	0	-0.31485	0.536931	0.092251	-0.12189	-0.55016
270	1.9607843	1.645934	2.182866	0	-0.21414	-0.7643
270	0.3318584	0.017008	2.199874	0.110619	-0.10352	-0.86782
270	0	-0.31485	1.885024	0	-0.21414	-1.08196
270	0	-0.31485	1.570174	0	-0.21414	-1.2961
271	1.3422819	1.027432	2.597606	0.671141	0.457003	-0.83909
271	0.5098789	0.195029	2.792635	0.509879	0.295741	-0.54335
272	0	-0.31485	2.477785	1.449275	1.235137	0.691786
272	0	-0.31485	2.162935	2.564103	2.349965	3.04175
273	0	-0.31485	1.848085	0.38835	0.174212	3.215962
273	0.5899705	0.275121	2.123205	0	-0.21414	3.001824
273	1.4295676	1.114718	3.237923	0.627615	0.413477	3.415301
273	0.6297229	0.314873	3.552796	0.251889	0.037751	3.453052
273	0	-0.31485	3.237946	0	-0.21414	3.238914
273	0.304414	-0.01044	3.22751	0	-0.21414	3.024776
273	0	-0.31485	2.91266	0	-0.21414	2.810638
273	0.0722022	-0.24265	2.670012	0.036101	-0.17804	2.632601
274	0	-0.31485	2.355162	0	-0.21414	2.418463
274	0.0712251	-0.24362	2.111537	0	-0.21414	2.204325
274	0	-0.31485	1.796687	0	-0.21414	1.990187
274	0.9708738	0.656024	2.452711	0	-0.21414	1.776049
274	0	-0.31485	2.137861	0	-0.21414	1.561911
274	0.5025126	0.187663	2.325524	0.335008	0.12087	1.682781
274	0	-0.31485	2.010674	0	-0.21414	1.468643
274	0	-0.31485	1.695824	0	-0.21414	1.254505
274	0.3429691	0.028119	1.723943	0.342969	0.128831	1.383336
274	0.5021521	0.187302	1.911245	0.215208	0.00107	1.384407
274	0.4726054	0.157755	2.069	0.397501	0.183363	1.56777
274	0	-0.31485	1.75415	0.641026	0.426888	1.994658
274	0.3582803	0.04343	1.79758	0.338376	0.124238	2.118895
274	0.297442	-0.01741	1.780172	0.297442	0.083304	2.202199
274	0.0777605	-0.23709	1.543083	0	-0.21414	1.988061
274	0	-0.31485	1.228233	0	-0.21414	1.773923
274	0.3138075	-0.00104	1.227191	0.146444	-0.06769	1.706229
274	0	-0.31485	0.912341	0	-0.21414	1.492091
274	0.1882058	-0.12664	0.785696	0	-0.21414	1.277953
274	0.1851852	-0.12966	0.656031	0.185185	-0.02895	1.249
274	0	-0.31485	0.341181	0	-0.21414	1.034862
274	0.4901961	0.175346	0.516528	0.245098	0.03096	1.065822
274	0.2072539	-0.1076	0.408931	0.103627	-0.11051	0.955311

Postumus Mint 1 & Mint 2 UK hoards continued

274	0.3547423	0.039892	0.448824	0.373413	0.159275	1.114586
274	0.5688282	0.253978	0.702802	0.796359	0.582221	1.696808
277	0.4237288	0.108879	0.811681	0	-0.21414	1.48267
279	0.2171291	-0.09772	0.71396	0.048251	-0.16589	1.316782
280	0	-0.31485	0.39911	0	-0.21414	1.102644
280	0	-0.31485	0.08426	0	-0.21414	0.888506
280	0.1527884	-0.16206	-0.0778	0.152788	-0.06135	0.827157
281	0.3591739	0.044324	-0.03348	0.119725	-0.09441	0.732743
281	0.0309119	-0.28394	-0.31742	0.061824	-0.15231	0.580429
281	0.2364998	-0.07835	-0.39577	0.059125	-0.15501	0.425416
281	0.2059997	-0.10885	-0.50462	0.090125	-0.12401	0.301403
281	0.1380739	-0.17678	-0.68139	0.138074	-0.07606	0.225339
282	1.0600707	0.745221	0.063828	0	-0.21414	0.011201
282	0.2455997	-0.06925	-0.00542	0.081867	-0.13227	-0.12107
282	0.2240478	-0.0908	-0.09622	0.392084	0.177946	0.056875
282	0.3289474	0.014097	-0.08213	0.328947	0.114809	0.171685
282	0.0982962	-0.21655	-0.29868	0.098296	-0.11584	0.055843
282	0.48627	0.17142	-0.12726	0.143021	-0.07112	-0.01527
282	0.2667655	-0.04808	-0.17535	0.088922	-0.12522	-0.14049
284	0.3473562	0.032506	-0.14284	0.038595	-0.17554	-0.31603
286	0.0865551	-0.22829	-0.37113	0.028852	-0.18529	-0.50132
289	0.1523722	-0.16248	-0.53361	0.068881	-0.14526	-0.64658
289	0	-0.31485	-0.84846	0	-0.21414	-0.86072
292	0.1461988	-0.16865	-1.01711	0	-0.21414	-1.07485
296	1.6129032	1.298053	0.28094	1.612903	1.398765	0.323912
296	0.182742	-0.13211	0.148832	0.049028	-0.16511	0.158802
296	0.166021	-0.14883	3.3E-06	0.05534	-0.1588	4.5E-06
	0.31485			0.214138		
	0.4229942			0.414244		
	69			69		
	0.0509225			0.049869		

Postumus Milan Mint UK hoards

DATE LAST COIN	% milan	diff from mean	cusum of diff
261			
261			
263			
263			
264			
265			
267			
267			
268	0	-0.31799	-0.31799
270			
270	0	-0.31799	-0.63597
270	0	-0.31799	-0.95396
270	0	-0.31799	-1.27194
270	0	-0.31799	-1.58993
270	0	-0.31799	-1.90791
270	1.176471	0.858486	-1.04942
271	0.671141	0.353156	-0.69627
271	0.12747	-0.19052	-0.88678
272	0.483092	0.165107	-0.72168
272	0	-0.31799	-1.03966
273	0.776699	0.458714	-0.58095
273	0	-0.31799	-0.89893
273	0.348675	0.03069	-0.86824
273	0.314861	-0.00312	-0.87137
273	0	-0.31799	-1.18935
273	0.608828	0.290843	-0.89851
273	0	-0.31799	-1.21649
273	0.234657	-0.08333	-1.29982
274	0.330033	0.012048	-1.28777
274	0.071225	-0.24676	-1.53453
274	3.125	2.807015	1.272482
274	0	-0.31799	0.954497
274	0.502513	0.184528	1.139024
274	0	-0.31799	0.821039
274	0	-0.31799	0.503054
274	0	-0.31799	0.185069
274	0.375633	0.057648	0.242717
274	0.502152	0.184167	0.426884
274	0.404829	0.086844	0.513728
274	0	-0.31799	0.195743
274	0.696656	0.378671	0.574414
274	0.35693	0.038945	0.613359
274	0.07776	-0.24022	0.373135
274	0	-0.31799	0.05515
274	0.523013	0.205028	0.260177
274	0	-0.31799	-0.05781
274	0.627353	0.309368	0.25156
274	0.185185	-0.1328	0.11876
274	0	-0.31799	-0.19922
274	0	-0.31799	-0.51721
274	0.725389	0.407404	-0.10981

Postumus Milan Mint UK hoards continued

274	0.205377	-0.11261	-0.22241
274	1.251422	0.933437	0.711023
277	0	-0.31799	0.393038
279	0.241255	-0.07673	0.316307
280	0.203169	-0.11482	0.201492
280	0	-0.31799	-0.11649
280	0.636618	0.318633	0.20214
281	0.344208	0.026223	0.228363
281	0.216383	-0.1016	0.126762
281	0.137958	-0.18003	-0.05327
281	0.309	-0.00899	-0.06225
281	0.172592	-0.14539	-0.20764
282	0.353357	0.035372	-0.17227
282	0.286533	-0.03145	-0.20372
282	0.205377	-0.11261	-0.31633
282	0.328947	0.010962	-0.30537
282	0.163827	-0.15416	-0.45953
282	0.171625	-0.14636	-0.60589
282	0.288996	-0.02899	-0.63488
284	0.347356	0.029371	-0.6055
286	0.288517	-0.02947	-0.63497
289	0.313094	-0.00489	-0.63986
289	0	-0.31799	-0.95785
292	0.438596	0.120611	-0.83724
296	1.612903	1.294918	0.45768
296	0.178285	-0.1397	0.31798
296	0	-0.31799	-4.6E-06
mean	0.317985		
sd	0.466867		
n	69		
error	0.056204		

Postumus Mint I French hoards

DATE LAST COIN	% issue 1	diff from mean	cusum of diff	% issue 2	diff from mean	cusum of diff
261	3.021105	-2.06913	-2.06913	0	-3.60329	-3.60329
261	17.83333	12.7431	10.67397	0	-3.60329	-7.20658
261	25.24752	20.15729	30.83127	0	-3.60329	-10.8099
262	2.272727	-2.8175	28.01376	25	21.39671	10.58683
262	2.105263	-2.98497	25.02879	0.701754	-2.90154	7.685294
262	1.538462	-3.55177	21.47702	0	-3.60329	4.082002
263	9.985735	4.895503	26.37253	5.991441	2.388149	6.470151
263	9.756098	4.665866	31.03839	7.317073	3.713781	10.18393
265	12.14953	7.059301	38.09769	8.566978	4.963686	15.14762
266	3.89016	-1.20007	36.89762	12.12815	8.524854	23.67247
266	19.44444	14.35421	51.25183	11.11111	7.507819	31.18029
267	0.34888	-4.74135	46.51048	0.569225	-3.03407	28.14623
268	5.769231	0.678999	47.18948	8.974359	5.371067	33.51729
268	16.08725	10.99702	58.1865	9.58873	5.985438	39.50273
268	5.708661	0.618429	58.80493	5.905512	2.30222	41.80495
269	8.282775	3.192543	61.99747	8.124505	4.521213	46.32616
270	0.312826	-4.77741	57.22007	0.364964	-3.23833	43.08783
270	25.02283	19.9326	77.15267	17.29072	13.68742	56.77526
270	0.704225	-4.38601	72.76666	0.704225	-2.89907	53.87619
270	5.059693	-0.03054	72.73612	2.046617	-1.55667	52.31952
270	13.95349	8.863256	81.59938	8.527132	4.92384	57.24336
270	6.397306	1.307074	82.90645	2.525253	-1.07804	56.16532
270	4.423495	-0.66674	82.23971	3.915881	0.312589	56.47791
270	6.190476	1.100244	83.33996	3.714286	0.110994	56.5889
270	0	-5.09023	78.24973	0	-3.60329	52.98561
270	8.431373	3.341141	81.59087	5.882353	2.279061	55.26467
271	2.304147	-2.78608	78.80478	2.764977	-0.83832	54.42635
271	5.629572	0.53934	79.34412	4.440961	0.837669	55.26402
274	0.441014	-4.64922	74.6949	0.110254	-3.49304	51.77098
274	0.090171	-5.00006	69.69484	0	-3.60329	48.16769
274	0.248231	-4.842	64.85284	0.037235	-3.56606	44.60164
274	0.705882	-4.38435	60.46849	0.117647	-3.48564	41.11599
274	0.331126	-4.75911	55.70939	0	-3.60329	37.5127
274	3.246753	-1.84348	53.86591	2.597403	-1.00589	36.50681
274	0.540541	-4.54969	49.31622	0	-3.60329	32.90352
274	5.454545	0.364313	49.68053	3.896104	0.292812	33.19633
274	0	-5.09023	44.5903	0	-3.60329	29.59304
275	2.223926	-2.86631	41.72399	0.920245	-2.68305	26.90999
275	0	-5.09023	36.63376	0	-3.60329	23.3067
275	0.33557	-4.75466	31.8791	0	-3.60329	19.70341
276	6.019417	0.929185	32.80828	2.847896	-0.7554	18.94801
276	0	-5.09023	27.71805	0	-3.60329	15.34472
279	14.28571	9.195482	36.91353	14.28571	10.68242	26.02714
280	2.126123	-2.96411	33.94943	1.938043	-1.66525	24.36189
283	0.045126	-5.04511	28.90432	0	-3.60329	20.7586
284	0.235849	-4.85438	24.04994	0.078616	-3.52468	17.23392
289	1.156503	-3.93373	20.11621	0.690898	-2.91239	14.32153

Postumus Mint 1 French hoards continued

	294	0	-5.09023	15.02598	0	-3.60329	10.71824
	294	0.183318	-4.90691	10.11906	0.091659	-3.51163	7.206605
	296	0.061425	-5.02881	5.090255	0	-3.60329	3.603313
	348	0	-5.09023	0.000023	0	-3.60329	0.000021
mean		5.090232			3.603292		
sd		6.528358			5.260431		
count		51			51		
error		0.914153			0.736608		

Postumus Mint 1 French hoards continued

DATE LAST COIN	% issue 3	diff from mean	cusum of diff	% issue 4	diff from mean	cusum of diff
261						
261						
261						
262						
262	0.175439	-6.14064	-6.14064			
262	1.538462	-4.77761	-10.9183			
263	17.1184	10.80233	-0.11593			
263	9.756098	3.440022	3.324096			
265	9.345794	3.029718	6.353814			
266	8.924485	2.608409	8.962223	0	-2.96946	-2.96946
266	13.88889	7.572813	16.53504	5.555556	2.586098	-0.38336
267	1.13845	-5.17763	11.35741	0.293794	-2.67566	-3.05902
268	22.4359	16.11982	27.47723	9.615385	6.645927	3.586902
268	17.08703	10.77095	38.24818	3.453761	0.484303	4.071204
268	14.0748	7.758727	46.00691	2.165354	-0.8041	3.267101
269	26.40464	20.08857	66.09548	17.88446	14.91501	18.18211
270	1.564129	-4.75195	61.34353	0.834202	-2.13526	16.04685
270	27.97565	21.65957	83.0031	2.891933	-0.07752	15.96933
270	0	-6.31608	76.68702	0.704225	-2.26523	13.70409
270	5.287095	-1.02898	75.65804	3.695281	0.725823	14.42992
270	17.05426	10.73819	86.39623	3.100775	0.131317	14.56123
270	5.218855	-1.09722	85.29901	4.377104	1.407646	15.96888
270	7.034083	0.718007	86.01702	2.828136	-0.14132	15.82756
270	11.90476	5.588686	91.6057	4.285714	1.316256	17.14381
270	0	-6.31608	85.28963	6.25	3.280542	20.42436
270	15.68627	9.370199	94.65982	8.823529	5.854071	26.27843
271	5.069124	-1.24695	93.41287	5.529954	2.560496	28.83892
271	11.05016	4.734081	98.14695	7.458203	4.488745	33.32767
274	0.330761	-5.98532	92.16164	0.220507	-2.74895	30.57872
274	0.090171	-6.2259	85.93573	0.090171	-2.87929	27.69943
274	0.173762	-6.14231	79.79342	0.260643	-2.70882	24.99062
274	0.705882	-5.61019	74.18323	0.235294	-2.73416	22.25645
274	0	-6.31608	67.86715	0.165563	-2.8039	19.45256
274	4.545455	-1.77062	66.09653	5.194805	2.225347	21.6779
274	1.621622	-4.69445	61.40207	0.540541	-2.42892	19.24899
274	8.831169	2.515093	63.91717	6.493506	3.524048	22.77303
274	0	-6.31608	57.60109	0	-2.96946	19.80358
275	0	-6.31608	51.28501	0.460123	-2.50934	17.29424
275	0	-6.31608	44.96894	0	-2.96946	14.32478
275	0	-6.31608	38.65286	0	-2.96946	11.35533
276	8.673139	2.357063	41.00993	3.68932	0.719862	12.07519
276	0	-6.31608	34.69385	0	-2.96946	9.10573
279	14.28571	7.969638	42.66349	14.28571	11.31626	20.42199
280	3.65257	-2.66351	39.99998	1.940768	-1.02869	19.3933
283	0	-6.31608	33.68391	0.06769	-2.90177	16.49153
284	0.157233	-6.15884	27.52506	0.078616	-2.89084	13.60069
289	2.433163	-3.88291	23.64215	1.246621	-1.72284	11.87785

Postumus Mint I French hoards continued

	294	0.294985	-6.02109	17.62106	0	-2.96946	8.908391
	294	0.091659	-6.22442	11.39664	0	-2.96946	5.938933
	296	0.030713	-6.28536	5.111279	0	-2.96946	2.969475
	348	1.204819	-5.11126	0.000022	0	-2.96946	0.000017
mean		6.316076			2.969458		
sd		7.641042			4.023995		
count		47			42		
error		1.114561			0.620916		

Postumus Mint I French hoards continued

DATE LAST COIN	% issue 5	diff from mean	cusum of diff	% issue 6	diff from mean	cusum of diff
261						
261						
261						
262						
262						
262						
263						
263						
265						
266						
266	2.777778	1.71449	1.71449	2.777778	1.188781	1.188781
267	0	-1.06329	0.651202	0	-1.589	-0.40022
268	1.282051	0.218763	0.869965	0	-1.589	-1.98921
268	1.158828	0.09554	0.965505	0.090888	-1.49811	-3.48732
268	0.098425	-0.96486	0.000642	0	-1.589	-5.07632
269	0.870483	-0.19281	-0.19216	0	-1.589	-6.66532
270	1.459854	0.396566	0.204403	0.573514	-1.01548	-7.6808
270	0.182648	-0.88064	-0.67624	0.152207	-1.43679	-9.11759
270	0	-1.06329	-1.73953	0	-1.589	-10.7066
270	2.046617	0.983329	-0.7562	5.798749	4.209752	-6.49683
270	4.651163	3.587875	2.831679	2.325581	0.736584	-5.76025
270	2.188552	1.125264	3.956943	6.734007	5.14501	-0.61524
270	1.812908	0.74962	4.706563	2.828136	1.239139	0.6239
270	1.714286	0.650998	5.357561	1.714286	0.125289	0.749189
270	0	-1.06329	4.294273	0	-1.589	-0.83981
270	2.941176	1.877888	6.172161	4.313725	2.724728	1.88492
271	4.608295	3.545007	9.717168	4.608295	3.019298	4.904218
271	4.218913	3.155625	12.87279	6.596134	5.007137	9.911355
274	0.220507	-0.84278	12.03001	0.661521	-0.92748	8.983879
274	0.180343	-0.88295	11.14707	0.090171	-1.49883	7.485054
274	0.446816	-0.61647	10.5306	0.074469	-1.51453	5.970526
274	0	-1.06329	9.467308	0.470588	-1.11841	4.852117
274	0.165563	-0.89773	8.569583	0	-1.589	3.26312
274	1.948052	0.884764	9.454347	1.948052	0.359055	3.622175
274	0.540541	-0.52275	8.931599	0	-1.589	2.033178
274	2.337662	1.274374	10.20597	2.077922	0.488925	2.522103
274	0	-1.06329	9.142686	0	-1.589	0.933106
275	1.763804	0.700516	9.843201	2.453988	0.864991	1.798097
275	0	-1.06329	8.779913	0.182815	-1.40618	0.391916
275	0	-1.06329	7.716625	0	-1.589	-1.19708
276	2.459547	1.396259	9.112884	1.747573	0.158576	-1.03851
276	0	-1.06329	8.049596	0	-1.589	-2.6275
279	0	-1.06329	6.986308	14.28571	12.69672	10.06921
280	1.226609	0.163321	7.149629	1.970752	0.381755	10.45097
283	0.033845	-1.02944	6.120186	0.248195	-1.3408	9.110168
284	0.078616	-0.98467	5.135515	0.393082	-1.19592	7.914252
289	0.150195	-0.91309	4.222422	0	-1.589	6.325255

Postumus Mint 1 French hoards continued

	294	0	-1.06329	3.159134	0	-1.589	4.736258
	294	0	-1.06329	2.095846	0	-1.589	3.147261
	296	0.030713	-1.03258	1.06327	0.030713	-1.55828	1.588977
	348	0	-1.06329	-1.8E -05	0	-1.589	-2.0E -05
mean		1.063288			1.588997		
sd		1.344988			2.780755		
count		41			41		
error		0.210052			0.434281		

Postumus Mint 1 & 2 French hoards continued

DATE LAST COIN	% issue 7	diff from mean	cusum of diff	% Mint 2, 1	diff from mean	cusum of diff
261						
261						
261						
262						
262						
262						
263						
263						
265						
266						
266						
267						
268						
268				0	-0.23735	-0.23735
268				0	-0.23735	-0.47469
269	0	-0.25072	-0.25072	0	-0.23735	-0.71204
270	0.2085506	-0.04217	-0.29289	0	-0.23735	-0.94938
270	0.0304414	-0.22028	-0.51317	0	-0.23735	-1.18673
270	0	-0.25072	-0.76388	0	-0.23735	-1.42407
270	0.9096077	0.658889	-0.105	1.023309	0.785964	-0.63811
270	0	-0.25072	-0.35571	2.325581	2.088236	1.45013
270	0	-0.25072	-0.60643	0.673401	0.436056	1.886186
270	0.2900653	0.039346	-0.56709	0.435098	0.197753	2.083939
270	0.1904762	-0.06024	-0.62733	0.190476	-0.04687	2.03707
270	0	-0.25072	-0.87805	0	-0.23735	1.799725
270	0.1960784	-0.05464	-0.93269	0.588235	0.35089	2.150615
271	0.921659	0.67094	-0.26175	1.382488	1.145143	3.295759
271	0.7314525	0.480733	0.218984	0.992685	0.75534	4.051099
274	0.3307607	0.080042	0.299026	0.110254	-0.12709	3.924008
274	0	-0.25072	0.048307	0.090171	-0.14717	3.776834
274	0.1613504	-0.08937	-0.04106	0.049646	-0.1877	3.589135
274	0.2352941	-0.01542	-0.05649	0.117647	-0.1197	3.469437
274	0	-0.25072	-0.30721	0	-0.23735	3.232092
274	1.9480519	1.697333	1.390127	0	-0.23735	2.994747
274	1.0810811	0.830362	2.220489	0	-0.23735	2.757402
274	0.5194805	0.268762	2.489251	0	-0.23735	2.520057
274	0	-0.25072	2.238532	0	-0.23735	2.282712
275	0.6134969	0.362778	2.60131	0.153374	-0.08397	2.198742
275	0.0914077	-0.15931	2.441998	0.091408	-0.14594	2.052804
275	0	-0.25072	2.191279	0	-0.23735	1.815459
276	0.1294498	-0.12127	2.07001	0.453074	0.215729	2.031189
276	0	-0.25072	1.819291	0	-0.23735	1.793844
279	0	-0.25072	1.568572	0	-0.23735	1.556499
280	0.32437	0.073651	1.642223 ?			
283	0.1128159	-0.1379	1.50432	0.011282	-0.22606	1.330435
284	0	-0.25072	1.253601	0.078616	-0.15873	1.171707
289	0	-0.25072	1.002882	0.01502	-0.22233	0.949381

Postumus Mint 1 & 2 French hoards continued

	294	0	-0.25072	0.752163	0	-0.23735	0.712036
	294	0	-0.25072	0.501444	0	-0.23735	0.474691
	296	0	-0.25072	0.250725	0	-0.23735	0.237346
	348	0	-0.25072	6.2E-06	0	-0.23735	1.2E-06
mean		0.2507192			0.237345		
sd		0.4173359			0.482899		
count		36			37		
error		0.069556			0.079388		

Postumus Milan Mint French hoards

DATE LAST COIN	% milan	diff from mean	cusum of diff
261			
261			
261			
262			
262			
262			
263			
263			
265			
266			
266			
267			
268			
268	0.022722	-0.66266	-0.66266
268	0	-0.68539	-1.34805
269	0	-0.68539	-2.03344
270	4.848801	4.163414	2.129975
270	0	-0.68539	1.444588
270	1.408451	0.723064	2.167652
270	1.478113	0.792726	2.960377
270	0	-0.68539	2.27499
270	0	-0.68539	1.589603
270	0.290065	-0.39532	1.194281
270	1.619048	0.933661	2.127942
270	0	-0.68539	1.442555
270	0.784314	0.098927	1.541482
271	1.843318	1.157931	2.699413
271	0.431034	-0.25435	2.44506
274	0.441014	-0.24437	2.200688
274	0.090171	-0.59522	1.605472
274	0.757106	0.071719	1.677191
274	0.588235	-0.09715	1.580039
274	0	-0.68539	0.894652
274	0.649351	-0.03604	0.858615
274	2.162162	1.476775	2.335391
274	1.818182	1.132795	3.468185
274	1.960784	1.275397	4.743583
275	0	-0.68539	4.058196
275	0	-0.68539	3.372809
275	0.33557	-0.34982	3.022992
276	0.517799	-0.16759	2.855405
276	0.851064	0.165677	3.021081
279	0	-0.68539	2.335694
280 ?			
283	0.372292	-0.31309	2.0226
284	0.314465	-0.37092	1.651678
289	0	-0.68539	0.966291

Postumus Milan Mint French hoards continued

	294	0.294985	-0.3904	0.57589
	294	0.183318	-0.50207	0.073821
	296	0.092138	-0.59325	-0.51943
	348	1.204819	0.519432	3.5E-06
mean		0.685387		
sd		0.957936		
count		37		
error		0.157484		

Victorinus Mint I UK hoards

DATE	LAST COIN	M1, 1, %of hoard	diff from mean	cusum of M1,2, %of diff hoard	diff from mean	cusum of diff
270		0	-0.01797	-0.01797	0	-0.51316
270		0	-0.01797	-0.03594	0.221239	-0.29192
270		0	-0.01797	-0.05391	1.975309	1.46215
270		0	-0.01797	-0.07188	1.342282	0.829123
270		0	-0.01797	-0.08985	0.207039	-0.30612
270		0	-0.01797	-0.10781	0	-0.51316
270		0	-0.01797	-0.12578	1.960784	1.447625
270	0.030694	0.012725	-0.11306	0.030694	-0.48247	1.632075
270		0	-0.01797	-0.13103	0	-0.51316
271		0	-0.01797	-0.149	0.191205	-0.32195
272		0	-0.01797	-0.16697	2.564103	2.050944
272		0	-0.01797	-0.18494	0.966184	0.453025
272		0	-0.01797	-0.2029	0	-0.51316
273		0	-0.01797	-0.22087	0	-0.51316
273		0	-0.01797	-0.23884	0.194175	-0.31898
273		0	-0.01797	-0.25681	0.152207	-0.36095
273	0.036101	0.018132	-0.23868	0.415162	-0.098	1.496679
273	0.13947	0.121501	-0.11718	1.046025	0.532866	2.029545
273	0.062972	0.045003	-0.07218	1.196474	0.683315	2.712859
273		0	-0.01797	-0.09014	0	-0.51316
273		0	-0.01797	-0.10811	0	-0.51316
274		0	-0.01797	-0.12608	0	-0.51316
274	0.215517	0.197548	0.071466	0.431034	-0.08212	1.091258
274		0	-0.01797	0.053497	0	-0.51316
274		0	-0.01797	0.035528	0	-0.51316
274		0	-0.01797	0.017559	0	-0.51316
274		0	-0.01797	-0.00041	0	-0.51316
274		0	-0.01797	-0.01838	0	-0.51316
274	0.037341	0.019372	0.000993	0.57879	0.065631	-1.40891
274		0	-0.01797	-0.01698	0.398089	-0.11507
274		0	-0.01797	-0.03495	0.502513	-0.01065
274		0	-0.01797	-0.05291	0	-0.51316
274		0	-0.01797	-0.07088	0.922509	0.40935
274		0	-0.01797	-0.08885	0.330033	-0.18313
274	0.113766	0.095797	0.006944	0.455083	-0.0581	-1.87965
274		0	-0.01797	-0.01102	0	-0.51316
274	0.125471	0.107501	0.096477	1.254705	0.741546	-1.65127
274	0.040036	0.022067	0.118543	0.684246	0.171087	-1.48018
274		0	-0.01797	0.100574	0	-0.51316
274		0	-0.01797	0.082605	0	-0.51316
274	0.048996	0.031027	0.113632	0.881921	0.368762	-2.13774
274		0	-0.01797	0.095663	0.860832	0.347673
274		0	-0.01797	0.077693	0.732218	0.219059
274		0	-0.01797	0.059724	0.654372	0.141213
274		0	-0.01797	0.041755	1.010101	0.496942
274		0	-0.01797	0.023786	1.282051	0.768892
277		0	-0.01797	0.005817	0.423729	-0.08943

Victorinus Mint 1 UK hoards continued

279	0.048251	0.030282	0.036099	0.482509	-0.03065	-0.28404
280	0	-0.01797	0.01813	0.534759	0.0216	-0.26244
280	0	-0.01797	0.000161	0.406339	-0.10682	-0.36926
281	0	-0.01797	-0.01781	0.586814	0.073655	-0.2956
281	0	-0.01797	-0.03578	0.296125	-0.21703	-0.51264
281	0	-0.01797	-0.05375	0.718348	0.205189	-0.30745
281	0.019708	0.001739	-0.05201	0.630666	0.117507	-0.18994
281	0.030912	0.012943	-0.03906	0.525502	0.012343	-0.1776
282	0.01482	-0.00315	-0.04221	0.452019	-0.06114	-0.23874
282	0.028604	0.010635	-0.03158	0.800915	0.287756	0.04902
282	0	-0.01797	-0.04955	0.450266	-0.06289	-0.01387
282	0	-0.01797	-0.06752	3.030303	2.517144	2.503271
282	0	-0.01797	-0.08549	0	-0.51316	1.990112
282	0.032765	0.014796	-0.07069	0.557012	0.043853	2.033965
284	0.115785	0.097816	0.027128	0.154381	-0.35878	1.675187
286	0.086555	0.068586	0.095714	0.432776	-0.08038	1.594803
287	0	-0.01797	0.077745	0	-0.51316	1.081644
289	0.016698	-0.00127	0.076474	0.52391	0.010751	1.092395
292	0	-0.01797	0.058505	0.438596	-0.07456	1.017833
296	0	-0.01797	0.040536	0.553403	0.040244	1.058077
296	0.013371	-0.0046	0.035938	0.481369	-0.03179	1.026287
296	0	-0.01797	0.017969	0	-0.51316	0.513128
340	0	-0.01797	-2.3E-08	0	-0.51316	-3.1E-05
mean	0.017969			0.513159		
sd	0.04006			0.602443		
count	70			70		
error	0.004788			0.072006		

Victorinus Mint I UK hoards continued

DATE	M1, 3, %	diff from	cusum of	M1, 5, % of	diff from	cusum of
LAST	of hoard	mean	diff	hoard	mean	diff
COIN						
270	0	-8.0479	-8.0479	0	-4.73359	-4.73359
270	9.62963	1.5817	-6.4662	5.185185	0.451599	-4.28199
270	7.84314	-0.2048	-6.671	0	-4.73359	-9.01557
270	1.10619	-6.9417	-13.613	0	-4.73359	-13.7492
270	0.27675	-7.7712	-21.384	0.092251	-4.64134	-18.3905
270	8.23529	0.18737	-21.197	9.411765	4.678179	-13.7123
270	7.3499	-0.698	-21.895	0.10352	-4.63007	-18.3424
270	16.1074	8.05946	-13.835	2.013423	-2.72016	-21.0625
271	0.38241	-7.6655	-21.501	0	-4.73359	-25.7961
272	15.3846	7.33669	-14.164	15.38462	10.65103	-15.1451
272	11.1111	3.06319	-11.101	0	-4.73359	-19.8787
272	10.5263	2.47839	-8.6224	21.05263	16.31905	-3.55964
273	14.4836	6.4357	-2.1867	4.596977	-0.13661	-3.69625
273	15.534	7.48605	5.29939	13.59223	8.858647	5.162397
273	13.1944	5.14652	10.4459	10.41667	5.683081	10.84548
273	9.00722	0.95929	11.4052	9.548736	4.81515	15.66063
273	12	3.95207	15.3573	4	-0.73359	14.92704
273	14.7059	6.65796	22.0152	0	-4.73359	10.19346
273	16.5969	8.54901	30.5642	6.276151	1.542565	11.73602
273	13.5464	5.4985	36.0627	6.697108	1.963522	13.69954
274	8.37521	0.32728	36.39	3.350084	-1.3835	12.31604
274	12.3386	4.29067	40.6807	8.464849	3.731263	16.0473
274	7.96296	-0.085	40.5957	4.074074	-0.65951	15.38779
274	8.54271	0.49479	41.0905	8.542714	3.809128	19.19692
274	13.2371	5.18921	46.2797	5.897114	1.163528	20.36045
274	6.60066	-1.4473	44.8325	4.290429	-0.44316	19.91729
274	9.375	1.32707	46.1595	6.25	1.516414	21.4337
274	2.03252	-6.0154	40.1441	0.813008	-3.92058	17.51313
274	6.59074	-1.4572	38.6869	3.416729	-1.31686	16.19627
274	14.2066	6.15872	44.8457	7.656827	2.923241	19.11951
274	1.7094	-6.3385	38.5071	1.851852	-2.88173	16.23778
274	6.46552	-1.5824	36.9247	6.25	1.516414	17.75419
274	9.09091	1.04298	37.9677	0	-4.73359	13.0206
274	2.72727	-5.3207	32.6471	0.909091	-3.8245	9.196109
274	2.16155	-5.8864	26.7607	1.478953	-3.25463	5.941476
274	7.33745	-0.7105	26.0502	0.731561	-4.00203	1.939451
274	4.91803	-3.1299	22.9203	11.47541	6.741824	8.681275
274	4.3771	-3.6708	19.2495	6.734007	2.000421	10.6817
274	11.4813	3.43334	22.6828	6.603212	1.869626	12.55132
274	0	-8.0479	14.6349	1.886792	-2.84679	9.704528
274	11.6946	3.64663	18.2815	6.129707	1.396121	11.10065
274	12.3959	4.34796	22.6295	5.013882	0.280296	11.38095
274	9.70874	1.66081	24.2903	4.854369	0.120783	11.50173
274	15.8838	7.83583	32.1261	4.697452	-0.03613	11.46559
274	14.1026	6.05464	38.1808	6.410256	1.67667	13.14227
277	8.47458	0.42665	38.6074	4.449153	-0.28443	12.85783
279	5.5006	-2.5473	36.0601	4.173703	-0.55988	12.29795

Victorinus Mint I UK hoards continued

279	5.500603	-2.54732	36.06009	4.173703	-0.55988	12.29795
280	8.683473	0.635547	36.69564	7.843137	3.109551	15.4075
280	5.282406	-2.76552	33.93012	4.266558	-0.46703	14.94047
281	5.999743	-2.04818	31.88193	4.544869	-0.18872	14.75176
281	8.709967	0.662041	32.54397	3.48698	-1.24661	13.50515
281	8.008284	-0.03964	32.50433	5.902658	1.169072	14.67422
281	5.069552	-2.97837	29.52596	4.358578	-0.37501	14.29921
281	7.883327	-0.1646	29.36136	5.932203	1.198617	15.49783
282	7.33605	-0.71188	28.64948	5.728047	0.994461	16.49229
282	11.87071	3.822783	32.47227	4.576659	-0.15693	16.33537
282	9.868421	1.820495	34.29276	3.618421	-1.11516	15.2202
282	6.716907	-1.33102	32.96174	5.242464	0.508878	15.72908
282	3.030303	-5.01762	27.94412	0	-4.73359	10.99549
282	9.373721	1.325795	29.26991	5.11666	0.383074	11.37857
284	8.086384	0.018458	29.28837	2.85604	-1.87755	9.501021
286	6.318523	-1.7294	27.55897	5.193306	0.45972	9.960741
287	4	-4.04793	23.51104	4	-0.73359	9.227155
289	6.627147	-1.42078	22.09026	5.264147	0.530561	9.757716
292	5.847953	-2.19997	19.89029	4.824561	0.090975	9.848691
296	5.660546	-2.38738	17.50291	4.769121	0.035535	9.884226
296	0	-8.04793	9.454985	0	-4.73359	5.15064
296	6.640841	-1.40708	8.0479	4.316547	-0.41704	4.733601
340	0	-8.04793	-2.6E-05	0	-4.73359	0.000015
mean	8.047926			4.733586		
sd	4.475972			3.867834		
count	69			69		
error	0.538844			0.465632		

Victorinus Mint 2 UK hoards

DATE						
LAST	M2, 1, % of	diff from	cusum of	M2, 2, % of	diff from	cusum of
COIN	hoard	mean	diff	hoard	mean	diff
270	0	-0.15806	-0.15806	2.469136	0.123726	0.123726
270	0.246914	0.088859	-0.0692	0.987654	-1.35776	-1.23403
270	3.921569	3.763514	3.694317	1.960784	-0.38463	-1.61866
270	0.110619	-0.04744	3.646882	0.331858	-2.01355	-3.63221
270	0.184502	0.026447	3.673329	0.184502	-2.16091	-5.79312
270	0	-0.15806	3.515274	5.294118	2.948708	-2.84441
270	0.207039	0.048984	3.564258	1.138716	-1.20669	-4.0511
270	0	-0.15806	3.406203	5.369128	3.023718	-1.02738
271	0	-0.15806	3.248148	0.446144	-1.89927	-2.92665
272	0	-0.15806	3.090093	2.564103	0.218693	-2.70796
272	0	-0.15806	2.932038	4.830918	2.485508	-0.22245
272	0	-0.15806	2.773983	0	-2.34541	-2.56786
273	0.125945	-0.03211	2.741872	3.84131	1.4959	-1.07196
273	0.776699	0.618644	3.360516	3.106796	0.761386	-0.31057
273	0	-0.15806	3.202461	2.777778	0.432368	0.121794
273	0.072202	-0.08585	3.116609	2.472924	0.127514	0.249309
273	0	-0.15806	2.958554	4	1.65459	1.903899
273	0	-0.15806	2.800499	5.882353	3.536943	5.440842
273	0.453278	0.295223	3.095721	5.613668	3.268258	8.7091
273	0	-0.15806	2.937666	3.805175	1.459765	10.16886
274	0	-0.15806	2.779611	2.680067	0.334657	10.50352
274	0.071736	-0.08632	2.693292	2.941176	0.595766	11.09929
274	0.37037	0.212315	2.905608	1.666667	-0.67874	10.42054
274	0	-0.15806	2.747553	1.507538	-0.83787	9.582672
274	0.188206	0.030151	2.777703	4.265997	1.920587	11.50326
274	0	-0.15806	2.619648	1.320132	-1.02528	10.47798
274	0	-0.15806	2.461593	0	-2.34541	8.132572
274	0	-0.15806	2.303538	0.813008	-1.5324	6.60017
274	0.28006	0.122005	2.425543	1.960418	-0.38499	6.215178
274	0.184502	0.026447	2.45199	4.428044	2.082634	8.297813
274	0.071225	-0.08683	2.36516	0.356125	-1.98928	6.308528
274	0	-0.15806	2.207105	1.616379	-0.72903	5.579497
274	0	-0.15806	2.04905	0	-2.34541	3.234087
274	0	-0.15806	1.890995	0.909091	-1.43632	1.797768
274	0.455063	0.297008	2.188003	0.910125	-1.43528	0.362483
274	0.163782	0.005727	2.19373	2.183764	-0.16165	0.200837
274	0	-0.15806	2.035675	1.639344	-0.70607	-0.50523
274	0	-0.15806	1.87762	3.703704	1.358294	0.853065
274	0.178465	0.02041	1.89803	2.795955	0.450545	1.30361
274	0	-0.15806	1.739975	0	-2.34541	-1.0418
274	0.209205	0.05115	1.791125	2.866109	0.520699	-0.5211
274	0.228646	0.070591	1.861716	2.956067	0.610657	0.089556
274	0	-0.15806	1.703661	2.912621	0.567211	0.656767
274	0.378185	0.22013	1.923791	4.498408	2.152998	2.809765
274	0	-0.15806	1.765736	3.846154	1.500744	4.310509
277	0.423729	0.265674	2.03141	3.389831	1.044421	5.354929
279	0.048251	-0.1098	1.921606	1.761158	-0.58425	4.770677

Victorinus Mint 2 UK hoards continued

280	0.101859	-0.0562	1.86541	2.597403	0.251993	5.02267
280	0.081268	-0.07679	1.788622	1.787891	-0.55752	4.465151
281	0.02575	-0.13231	1.656317	1.493498	-0.85191	3.613239
281	0.104759	-0.0533	1.603021	3.082909	0.737499	4.350738
281	0.069037	-0.08902	1.514003	2.623404	0.277994	4.628732
281	0.092736	-0.06532	1.448684	1.081917	-1.26349	3.365238
281	0.157667	-0.00039	1.448295	1.951123	-0.39429	2.970952
282	0.125973	-0.03208	1.416213	2.141534	-0.20388	2.767076
282	0.200229	0.042174	1.458387	3.74714	1.40173	4.168805
282	0	-0.15806	1.300332	5.263158	2.917748	7.086553
282	0.098296	-0.05976	1.240573	2.293578	-0.05183	7.034721
282	0	-0.15806	1.082518	3.030303	0.684893	7.719614
282	0.1228	-0.03526	1.047263	2.783463	0.438053	8.157667
284	0.038595	-0.11946	0.927803	2.392898	0.047488	8.205156
286	0.057703	-0.10035	0.827451	1.644547	-0.70086	7.504293
287	0	-0.15806	0.669396	0	-2.34541	5.158883
289	0.121063	-0.03699	0.832404	1.882736	-0.46267	4.696209
292	0	-0.15806	0.474349	1.461988	-0.88342	3.812787
296	0.102514	-0.05554	0.418808	1.693707	-0.6517	3.161084
296	0	-0.15806	0.260753	2.380952	0.035542	3.196626
296	0.05534	-0.10271	0.158038	1.494189	-0.85122	2.345405
340	0	-0.15806	-1.7E-05	0	-2.34541	-4.8E-06
mean	0.158055			2.34541		
sd	0.481992			1.509343		
count	69			69		
error	0.058025			0.181704		

Victorinus Mint 2 UK hoards continued

DATE						
LAST	M2, 3, % of	diff from	cusum of	M2, 5, % of	diff from	cusum of
COIN	hoard	mean	diff	hoard	mean	diff
270	0	-1.69085	-1.69085	0	-2.70562	-2.70562
270	0.740741	-0.95011	-2.64095	0.246914	-2.45871	-5.16433
270	0	-1.69085	-4.3318	0	-2.70562	-7.86996
270	0.110619	-1.58023	-5.91202	0	-2.70562	-10.5756
270	0.092251	-1.5986	-7.51062	0.092251	-2.61337	-13.189
270	3.529412	1.838566	-5.67205	5.294118	2.588494	-10.6005
270	1.966874	0.276028	-5.39603	0.414079	-2.29155	-12.892
270	4.697987	3.007141	-2.38888	1.342282	-1.36334	-14.2553
271	0.063735	-1.62711	-4.016	0	-2.70562	-16.961
272	0	-1.69085	-5.70684	2.564103	-0.14152	-17.1025
272	2.898551	1.207705	-4.49914	0.483092	-2.22253	-19.325
272	0	-1.69085	-6.18998	10.52632	7.820692	-11.5043
273	3.400504	1.709658	-4.48033	4.093199	1.387575	-10.1168
273	4.854369	3.163523	-1.3168	7.572816	4.867192	-5.24957
273	4.861111	3.170265	1.853463	6.25	3.544376	-1.70519
273	2.65343	0.962584	2.816046	5.108303	2.402679	0.697487
273	0	-1.69085	1.1252	12	9.294376	9.991863
273	0	-1.69085	-0.56565	2.941176	0.235552	10.22742
273	3.556485	1.865639	1.299994	2.301255	-0.40437	9.823046
273	4.109589	2.418743	3.718737	3.957382	1.251758	11.0748
274	1.507538	-0.18331	3.535428	3.517588	0.811964	11.88677
274	3.084648	1.393802	4.929231	4.591105	1.885481	13.77225
274	3.148148	1.457302	6.386533	4.074074	1.36845	15.1407
274	2.512563	0.821717	7.20825	1.507538	-1.19809	13.94261
274	2.885822	1.194976	8.403226	4.579674	1.87405	15.81666
274	1.650165	-0.04068	8.362545	1.980198	-0.72543	15.09124
274	3.125	1.434154	9.796699	6.25	3.544376	18.63561
274	0	-1.69085	8.105853	0	-2.70562	15.92999
274	1.587005	-0.10384	8.002012	2.371173	-0.33445	15.59554
274	3.96679	2.275944	10.27796	3.96679	1.261166	16.8567
274	0.071225	-1.61962	8.658335	0.712251	-1.99337	14.86333
274	2.262931	0.572085	9.23042	2.909483	0.203859	15.06719
274	0	-1.69085	7.539574	0	-2.70562	12.36156
274	0.909091	-0.78176	6.757818	1.818182	-0.88744	11.47412
274	0.796359	-0.89449	5.863332	0.113766	-2.59186	8.882264
274	1.173773	-0.51707	5.346259	0.505905	-2.19972	6.682545
274	0	-1.69085	3.655413	0	-2.70562	3.976921
274	1.010101	-0.68074	2.974668	3.703704	0.99808	4.975001
274	2.795955	1.105109	4.079777	4.640095	1.934471	6.909472
274	0	-1.69085	2.388931	1.886792	-0.81883	6.09064
274	3.012552	1.321706	3.710637	3.263598	0.557974	6.648615
274	2.89074	1.199894	4.910531	2.972399	0.266775	6.91539
274	0	-1.69085	3.219685	1.941748	-0.76388	6.151513
274	3.224522	1.533676	4.753361	3.682325	0.976701	7.128214
274	0.641026	-1.04982	3.703541	2.564103	-0.14152	6.986693
277	1.483051	-0.2078	3.495746	1.483051	-1.22257	5.76412
279	1.302774	-0.38807	3.107674	2.436671	-0.26895	5.495166

Victorinus Mint 2 UK hoards continued

280	2.266361	0.575515	3.683189	4.685511	1.979887	7.475053
280	0.934579	-0.75627	2.926923	2.478667	-0.22696	7.248096
281	1.583623	-0.10722	2.8197	3.064246	0.358622	7.606718
281	2.529183	0.838337	3.658037	2.70877	0.003146	7.609864
281	3.072144	1.381298	5.039334	2.761477	0.055853	7.665717
281	1.514683	-0.17616	4.863171	2.040185	-0.66544	7.000279
281	2.029957	0.339111	5.202282	3.015372	0.309748	7.310027
282	1.993331	0.302485	5.504767	3.171545	0.465921	7.775948
282	2.717391	1.026545	6.531312	2.660183	-0.04544	7.730508
282	1.315789	-0.37506	6.156256	3.947368	1.241744	8.972252
282	1.63827	-0.05258	6.10368	2.621232	-0.08439	8.88786
282	0	-1.69085	4.412834	0	-2.70562	6.182236
282	2.087597	0.396751	4.809585	3.192796	0.487172	6.669408
284	2.006947	0.316101	5.125686	2.585874	-0.11975	6.549658
286	1.875361	0.184515	5.310201	2.769763	0.064139	6.613797
287	0	-1.69085	3.619355	0	-2.70562	3.908173
289	1.79507	0.104224	3.723578	2.861675	0.156051	4.064225
292	2.192982	0.502136	4.225715	3.362573	0.656949	4.721174
296	1.59565	-0.0952	4.130519	3.057586	0.351962	5.073136
296	0	-1.69085	2.439673	0	-2.70562	2.367512
296	1.438849	-0.252	2.187676	3.043719	0.338095	2.705606
340	0	-1.69085	0.49683	0	-2.70562	-1.8E-05
mean	1.698046			2.705624		
sd	1.387276			2.313372		
count	69			69		
error	0.167008			0.278497		

Victorinus Mint 1 French hoards

DATE LAST COIN	M1, 1, %of hoard	diff from mean	cusum of M1,2, %of diff hoard		diff from mean	cusum of diff
269	0	-0.01998	-0.01998	0	-0.38102	-0.38102
270	0	-0.01998	-0.03997	0	-0.38102	-0.76204
270	0.284252	0.26427	0.224304	2.671973	2.290954	1.528916
270	0.030694	0.010711	0.235015	0.061387	-0.31963	1.209284
270	0	-0.01998	0.215032	0.095238	-0.28578	0.923503
270	0	-0.01998	0.195049	0.104275	-0.27674	0.646759
270	0	-0.01998	0.175066	1.515152	1.134133	1.780892
270	0	-0.01998	0.155083	0	-0.38102	1.399873
270	0.071582	0.051599	0.206682	0.572656	0.191637	1.59151
271	0.039185	0.019202	0.225885	1.489028	1.108009	2.699519
274	0	-0.01998	0.205902	0.040404	-0.34081	2.358904
274	0	-0.01998	0.185919	0	-0.38102	1.977885
274	0	-0.01998	0.165936	0.541028	0.160009	2.137894
274	0	-0.01998	0.145953	0.347524	-0.0335	2.104399
274	0	-0.01998	0.12597	0.330761	-0.05026	2.054141
274	0.011416	-0.00857	0.117403	0.091324	-0.28969	1.764446
274	0	-0.01998	0.09742	0.993377	0.612358	2.376804
274	0.07622	0.056237	0.153657	0.228659	-0.15236	2.224444
274	0	-0.01998	0.133674	0.779221	0.398202	2.622646
275	0	-0.01998	0.113691	0	-0.38102	2.241627
276	0.12945	0.109467	0.223158	1.165049	0.78403	3.025656
276	0	-0.01998	0.203175	0	-0.38102	2.644637
276	0	-0.01998	0.183192	0.425532	0.044513	2.68915
276	0	-0.01998	0.163209	0.649351	0.268332	2.957482
279	0	-0.01998	0.143227	0	-0.38102	2.576463
280	0.016636	-0.00335	0.13988	0.299451	-0.08157	2.494895
284	0	-0.01998	0.119897	0.157233	-0.22379	2.271108
289	0	-0.01998	0.099914	0.01502	-0.366	1.905109
294	0	-0.01998	0.079931	0	-0.38102	1.52409
294	0	-0.01998	0.059949	0	-0.38102	1.143071
296	0	-0.01998	0.039966	0	-0.38102	0.762052
309	0	-0.01998	0.019983	0	-0.38102	0.381033
309	0	-0.01998	9.6E-11	0	-0.38102	0.000014
mean	0.019983			0.381019		
sd	0.055396			0.598618		
count	33			33		
error	0.009643			0.104206		

Victorinus Mint I French hoards continued

DATE LAST COIN	M1, 3, % of hoard	diff from mean	cusum of diff	M1, 5, % of hoard	diff from mean	cusum of diff
269	0.166667	-3.31037	-3.31037	0	-1.07182	-1.07182
270	3.047619	-0.42942	-3.73979	0.095238	-0.97659	-2.04841
270	0	-3.47704	-7.21682	0	-1.07182	-3.12023
270	0.184162	-3.29287	-10.5097	0	-1.07182	-4.19206
270	0	-3.47704	-13.9867	0	-1.07182	-5.26388
270	14.14141	10.66438	-3.32235	0.16835	-0.90347	-6.16736
270	2.325581	-1.15145	-4.47381	0	-1.07182	-7.23918
270	9.38033	5.903294	1.429485	0	-1.07182	-8.311
270	4.3665	0.889464	2.318949	0	-1.07182	-9.38283
271	1.867816	-1.60922	0.709729	0.07837	-0.99345	-10.3763
274	14.81481	11.33778	12.04751	3.703704	2.63188	-7.7444
274	1.655629	-1.82141	10.2261	3.476821	2.404997	-5.3394
274	1.506849	-1.97019	8.255914	1.826484	0.75466	-4.58474
274	3.582317	0.105281	8.361195	4.268293	3.198469	-1.38828
274	2.060608	-1.41643	6.944765	2.30303	1.231206	-0.15707
274	6.292665	2.815629	9.760394	1.19151	0.119886	-0.03738
274	5.181918	1.704882	11.46528	3.417861	2.346037	2.308654
274	2.344454	-1.13258	10.33269	3.877367	2.805543	5.114197
274	2.337662	-1.13937	9.193321	0	-1.07182	4.042373
275	1.342282	-2.13475	7.058567	0.671141	-0.40068	3.64169
276	0.162206	-3.31483	3.743737	0.324412	-0.74741	2.894278
276	2.12766	-1.34938	2.394361	2.553191	1.481367	4.375645
276	8.441558	4.964522	7.358883	0.649351	-0.42247	3.953172
276	6.084142	2.607106	9.965989	0.906149	-0.16568	3.787497
279	14.28571	10.80868	20.77467	0	-1.07182	2.715673
280	3.460323	-0.01671	20.75795	3.526867	2.455043	5.170716
284	2.358491	-1.11855	19.63941	1.965409	0.893585	6.064301
289	0.225293	-3.25174	16.38767	0	-1.07182	4.992477
294	0.294985	-3.18205	13.20562	0	-1.07182	3.920653
294	0.641613	-2.83542	10.37019	0.366636	-0.70519	3.215465
296	0.030713	-3.44632	6.923869	0	-1.07182	2.143641
309	0.030211	-3.44682	3.477044	0	-1.07182	1.071817
309	0	-3.47704	8.4E-06	0	-1.07182	-7.1E-06
mean	3.477036			1.071824		
sd	4.265054			1.454365		
count	33			33		
error	0.742451			0.253172		

Victorinus Mint 2 French hoards

DATE LAST COIN	M2, 1, % of hoard	diff from mean	cusum of diff	M2, 2, % of hoard	diff from mean	cusum of diff
269	0	-0.0404	-0.0404	0	-1.07982	-1.07982
270	0	-0.0404	-0.08079	1.047619	-0.0322	-1.11203
270	0	-0.0404	-0.12119	0	-1.07982	-2.19185
270	0	-0.0404	-0.16158	0.061387	-1.01844	-3.21029
270	0	-0.0404	-0.20198	0	-1.07982	-4.29011
270	0.3367	0.296305	0.09433	7.744108	6.664285	2.374176
270	0	-0.0404	0.053935	3.100775	2.020952	4.395128
270	0.170551	0.130156	0.184092	3.52473	2.444907	6.840035
270	0.143164	0.102769	0.286861	3.937008	2.857185	9.69722
271	0.248171	0.207776	0.494637	2.61233	1.532507	11.22973
274	0	-0.0404	0.454242	0	-1.07982	10.1499
274	0	-0.0404	0.413847	0.662252	-0.41757	9.732333
274	0.022831	-0.01756	0.396283	0.399543	-0.68028	9.052053
274	0	-0.0404	0.355888	0.990854	-0.08897	8.963084
274	0	-0.0404	0.315493	0.646465	-0.43336	8.529726
274	0.037235	-0.00316	0.312333	0.843987	-0.23584	8.293889
274	0	-0.0404	0.271938	0.661521	-0.4183	7.875588
274	0	-0.0404	0.231543	1.442741	0.362918	8.238506
274	0.25974	0.219345	0.450888	0.779221	-0.3006	7.937904
275	0	-0.0404	0.410493	0	-1.07982	6.858081
276	0	-0.0404	0.370098	0	-1.07982	5.778258
276	0	-0.0404	0.329703	0	-1.07982	4.698435
276	0	-0.0404	0.289308	1.948052	0.868229	5.566664
276	0.064725	0.02433	0.313638	2.847896	1.768073	7.334737
279	0	-0.0404	0.273243	0	-1.07982	6.254914
280	0.049909	0.009514	0.282757	1.064715	-0.01511	6.239806
284	0	-0.0404	0.242362	0.550314	-0.52951	5.710297
289	0	-0.0404	0.201967	0.120156	-0.95967	4.750631
294	0	-0.0404	0.161572	0.294985	-0.78484	3.965793
294	0	-0.0404	0.121177	0.091659	-0.98816	2.977629
296	0	-0.0404	0.080782	0.061425	-1.0184	1.959231
309	0	-0.0404	0.040387	0	-1.07982	0.879408
309	0	-0.0404	-8.5E-06	0.200401	-0.87942	-1.4E-05
mean	0.040395			1.079823		
sd	0.087811			1.642111		
count	33			33		
error	0.015286			0.285855		

Victorinus Mint 2 French hoards continued

DATE	LAST	M2, 3, % of	diff from	cusum of	M2, 5, % of	diff from	cusum of
COIN		hoard	mean	diff	hoard	mean	diff
	269	0	-0.65799	-0.65799	0	-0.4367	-0.4367
	270	0.190476	-0.46752	-1.12551	0.095238	-0.34147	-0.77817
	270	0	-0.65799	-1.7835	0	-0.4367	-1.21487
	270	0	-0.65799	-2.44149	0	-0.4367	-1.65158
	270	6.25	5.592008	3.150516	0	-0.4367	-2.08828
	270	0.3367	-0.32129	2.829225	0	-0.4367	-2.52499
	270	0	-0.65799	2.171233	0	-0.4367	-2.96169
	270	0	-0.65799	1.513241	0	-0.4367	-3.39839
	270	0	-0.65799	0.855249	0	-0.4367	-3.8351
	271	0.875131	0.217139	1.072387	0.065308	-0.3714	-4.20649
	274	3.703704	3.045712	4.118099	0	-0.4367	-4.6432
	274	0.165563	-0.49243	3.62567	0.993377	0.556673	-4.08652
	274	0.479452	-0.17854	3.44713	0.76484	0.328136	-3.75839
	274	0.914634	0.256642	3.703772	1.905488	1.468784	-2.2896
	274	0.161616	-0.49638	3.207396	0.727273	0.290569	-1.99904
	274	0.595755	-0.06224	3.145159	0.906044	0.46934	-1.5297
	274	1.433297	0.775305	3.920464	2.094818	1.658114	0.128419
	274	0.360685	-0.29731	3.623157	1.623084	1.18638	1.314799
	274	0.779221	0.121229	3.744386	0	-0.4367	0.878095
	275	0.33557	-0.32242	3.421965	0	-0.4367	0.441391
	276	0	-0.65799	2.763973	0.243309	-0.19339	0.247996
	276	0	-0.65799	2.105981	0.851064	0.41436	0.662356
	276	1.948052	1.29006	3.39604	0	-0.4367	0.225652
	276	1.294498	0.636506	4.032547	0.711974	0.27527	0.500922
	279	0	-0.65799	3.374555	0	-0.4367	0.084218
	280	0.981534	0.323542	3.698097	2.362336	1.925632	1.98985
	284	0.786164	0.128172	3.826268	1.022013	0.585309	2.575158
	289	0.030039	-0.62795	3.198315	0.045059	-0.39165	2.183513
	294	0	-0.65799	2.540323	0	-0.4367	1.746809
	294	0.091659	-0.56633	1.97399	0	-0.4367	1.310105
	296	0	-0.65799	1.315998	0	-0.4367	0.873401
	309	0	-0.65799	0.658006	0	-0.4367	0.436697
	309	0	-0.65799	0.000014	0	-0.4367	-7.3E-06
	mean	0.657992			0.436704		
	sd	1.260561			0.689489		
	count	33			33		
	error	0.219436			0.120025		

Tetricus I Mint I UK hoards

Date last coin	M1 - 2			M1 - 3		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
272	0	-0.19666	-0.19666	1.176471	-1.06806	-1.06806
272	0	-0.19666	-0.39331	10.52632	8.281785	7.213724
272	2.564103	2.367447	1.974135	0	-2.24453	4.969193
272	0	-0.19666	1.777479	0	-2.24453	2.724662
273	0	-0.19666	1.580823	4.861111	2.61658	5.341242
273	0	-0.19666	1.384167	1.322418	-0.92211	4.41913
273	0.32491	0.128254	1.51242	5	2.755469	7.174599
273	0.034868	-0.16179	1.350632	1.011158	-1.23337	5.941225
273	0.152207	-0.04445	1.306183	2.891933	0.647402	6.588627
273	0	-0.19666	1.109527	0	-2.24453	4.344096
273	0	-0.19666	0.912871	2.941176	0.696645	5.040742
273	0.294985	0.098329	1.0112	5.309735	3.065204	8.105945
273	0	-0.19666	0.814544	4.660194	2.415663	10.52161
274	0.430416	0.23376	1.048304	4.662841	2.41831	12.93992
274	0.023657	-0.173	0.875306	0.354862	-1.88967	11.05025
274	0.188206	-0.00845	0.866855	2.50941	0.264879	11.31513
274	0.37037	0.173714	1.04057	1.481481	-0.76305	10.55208
274	0	-0.19666	0.843914	2.345059	0.100528	10.65261
274	0	-0.19666	0.647258	2.389078	0.144547	10.79715
274	3.125	2.928344	3.575602	0	-2.24453	8.552623
274	0	-0.19666	3.378946	0.323276	-1.92126	6.631368
274	0.092251	-0.10441	3.274541	2.214022	-0.03051	6.600859
274	0	-0.19666	3.077885	1.210826	-1.0337	5.567154
274	0	-0.19666	2.881229	1.818182	-0.42635	5.140805
274	0	-0.19666	2.684573	0	-2.24453	2.896274
274	0	-0.19666	2.487917	1.282051	-0.96248	1.933794
274	0.056012	-0.14064	2.347273	2.072442	-0.17209	1.761705
274	0	-0.19666	2.150617	3.883495	1.638964	3.400669
274	0.35693	0.160274	2.310891	2.201071	-0.04346	3.357209
274	0	-0.19666	2.114235	1.886792	-0.35774	2.99947
274	0.17727	-0.01939	2.094849	1.871184	-0.37335	2.626123
274	0.032664	-0.16399	1.930857	2.057815	-0.18672	2.439407
274	0	-0.19666	1.734201	0	-2.24453	0.194876
277	0.423729	0.227073	1.961274	1.483051	-0.76148	-0.5666
279	0.048251	-0.14841	1.812868	1.3269	-0.91763	-1.48424
280	0.229183	0.032527	1.845395	5.755029	3.510498	2.026263
281	0.078833	-0.11782	1.727572	2.936539	0.692008	2.718271
281	0.034518	-0.16214	1.565435	2.312737	0.068206	2.786478
281	0.123648	-0.07301	1.492426	1.94745	-0.29708	2.489396
281	0.074828	-0.12183	1.370598	1.316971	-0.92756	1.561836
281	0.038625	-0.15803	1.212567	3.192996	0.948465	2.510301
282	0.200074	0.003418	1.215985	3.719896	1.475365	3.985667
282	0.028604	-0.16805	1.047933	2.43135	0.186819	4.172486
282	0	-0.19666	0.851277	0	-2.24453	1.927955
282	0.328947	0.132291	0.983569	1.315789	-0.92874	0.999213
282	0.081867	-0.11479	0.868779	1.760131	-0.4844	0.514813

Tetricus I Mint I UK hoards continued

282	0.131062	-0.06559	0.803185	2.391874	0.147343	0.662156
284	0.038595	-0.15806	0.645124	3.512157	1.267628	1.929783
286	0.115407	-0.08125	0.563875	2.53895	0.294419	2.224202
287	0	-0.19666	0.367219	0	-2.24453	-0.02033
289	0.162809	-0.03385	0.333372	2.682168	0.437637	0.417308
292	0.438596	0.24194	0.575312	2.923977	0.679446	1.096754
294	0	-0.19666	0.378656	0.52358	-1.72097	-0.62422
296	0.155999	-0.04066	0.337999	3.926725	1.682194	1.057977
296	0.05534	-0.14132	0.196684	3.431101	1.18657	2.244547
395	0	-0.19666	0.000028	0	-2.24453	0.000016
mean	0.196656			2.244531		
sd	0.53291			1.887572		
count	56			56		
error	0.071213			0.252237		

Tetricus I Mint I UK hoards continued

Date last coin	M1 - 4			M1 - 4 (incl Tet 2)		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
272	0	-7.38062	-7.38062	0	-11.5701	-11.5701
272	5.263158	-2.11746	-9.49808	5.263158	-6.30698	-17.8771
272	7.692308	0.311688	-9.18639	7.692308	-3.87783	-21.755
272	0	-7.38062	-16.567	0	-11.5701	-33.3251
273	7.638889	0.258269	-16.3087	8.333333	-3.23681	-36.5619
273	3.148615	-4.23201	-20.5408	3.526448	-8.04369	-44.6056
273	12.05776	4.677142	-15.8636	17.27437	5.704228	-38.9014
273	1.569038	-5.81158	-21.6752	1.847978	-9.72216	-48.6235
273	7.001522	-0.3791	-22.0543	9.284627	-2.28551	-50.909
273	16	8.61938	-13.4349	20	8.42986	-42.4792
273	0	-7.38062	-20.8155	2.941176	-8.62896	-51.1081
273	7.669617	0.288997	-20.5265	14.15929	2.589152	-48.519
273	6.019417	-1.3612	-21.8877	6.601942	-4.9682	-53.4872
274	8.536585	1.155965	-20.7318	10.04304	-1.5271	-55.0143
274	1.770668	-5.60995	-26.3417	2.787938	-8.7822	-63.7965
274	8.971142	1.590522	-24.7512	11.04141	-0.52873	-64.3252
274	10.55556	3.174936	-21.5763	14.25926	2.689119	-61.6361
274	5.695142	-1.68548	-23.2617	11.39028	-0.17986	-61.816
274	3.640501	-3.74012	-27.0019	5.346985	-6.22315	-68.0391
274	6.25	-1.13062	-28.1325	18.75	7.17986	-60.8593
274	1.724138	-5.65648	-33.789	14.11638	2.546239	-58.313
274	5.99631	-1.38431	-35.1733	8.579336	-2.9908	-61.3038
274	2.279202	-5.10142	-40.2747	3.062678	-8.50746	-69.8113
274	5.454545	-1.92607	-42.2008	8.181818	-3.38832	-73.1996
274	4.918033	-2.46259	-44.6634	13.11475	1.544614	-71.655
274	3.846154	-3.53447	-48.1978	5.769231	-5.80091	-77.4559
274	5.713219	-1.6674	-49.8652	8.140403	-3.42974	-80.8856
274	6.796117	-0.5845	-50.4497	8.737864	-2.83228	-83.7179
274	9.161214	1.780594	-48.6691	11.83819	0.268052	-83.4499
274	30.18868	22.80806	-25.8611	35.84906	24.27892	-59.1709
274	7.169588	-0.21103	-26.0721	13.39374	1.823596	-57.3473
274	2.809081	-4.57154	-30.6436	3.103054	-8.46709	-65.8144
274	0	-7.38062	-38.0243	0	-11.5701	-77.3846
277	8.050847	0.670227	-37.354	13.55932	1.989182	-75.3954
279	8.928417	1.545797	-35.8082	14.7889	3.218762	-72.1766
280	19.50598	12.12536	-23.6829	32.77311	21.20297	-50.9737
281	13.16516	5.784536	-17.8983	20.00394	8.433802	-42.5399
281	12.73731	5.356694	-12.5416	18.67449	7.104351	-35.4355
281	9.984544	2.603924	-9.93772	16.44513	4.874991	-30.5605
281	7.363065	-0.01756	-9.95527	10.76025	-0.80989	-31.3704
281	12.01236	4.63174	-5.32353	18.5786	7.008462	-24.3619
282	11.28566	3.905041	-1.41849	18.29567	6.725525	-17.6364
282	3.804348	-3.57627	-4.99476	6.922197	-4.64794	-22.2844
282	3.030303	-4.35032	-9.34508	6.060606	-5.50953	-27.7939
282	10.85526	3.474643	-5.87044	13.81579	2.245649	-25.5482
282	10.02865	2.648033	-3.22241	15.59558	4.025439	-21.5228

Tetricus I Mint I UK hoards continued

282	11.89384	4.51322	1.290815	19.72477	8.154631	-13.3682
284	8.876882	1.496262	2.787076	15.01351	3.443368	-9.92481
286	11.36757	3.986951	6.774027	17.77265	6.202509	-3.7223
287	4	-3.38062	3.393407	8	-3.57014	-7.29244
289	12.22317	4.842553	8.23596	19.60801	8.037867	0.745429
292	7.602339	0.221719	8.457679	14.18129	2.611147	3.356575
294	1.04712	-6.3335	2.12418	1.570681	-9.99946	-6.64288
296	10.55447	3.173846	5.298026	18.38117	6.811033	0.168149
296	9.463199	2.082579	7.380604	17.70891	6.13877	6.306919
395	0	-7.38062	-1.6E-05	5.263158	-6.30698	-6.3E-05
mean	7.38062			11.57014		
sd	5.316147			7.434602		
count	56			56		
error	0.7104			0.99349		

Tetricus I Mint I UK hoards continued

Date last coin	M1 - 5			M1 - 5 (incl Tet 2)		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
272						
272						
272						
272						
273	3.472222	-1.7181	-1.7181	3.472222	-4.30831	-4.30831
273	0	-5.19032	-6.90842	0	-7.78053	-12.0888
273	0	-5.19032	-12.0987	0	-7.78053	-19.8694
273	0.244073	-4.94625	-17.045	0.244073	-7.53646	-27.4058
273	0	-5.19032	-22.2353	0	-7.78053	-35.1864
273	8	2.809681	-19.4256	20	12.21947	-22.9669
273	0	-5.19032	-24.6159	2.941176	-4.83936	-27.8063
273	4.424779	-0.76554	-25.3815	8.259587	0.479054	-27.3272
273	0.194175	-4.99614	-30.3776	0.194175	-7.58636	-34.9136
274	0.502152	-4.68817	-35.0658	0.573888	-7.20664	-42.1202
274	1.412167	-3.77815	-38.8439	2.158286	-5.62225	-47.7425
274	0.690088	-4.50023	-43.3442	0.690088	-7.09045	-54.8329
274	2.962963	-2.22736	-45.5715	5.740741	-2.03979	-56.8727
274	3.350084	-1.84024	-47.4118	7.035176	-0.74536	-57.618
274	0.682594	-4.50773	-51.9195	1.478953	-6.30158	-63.9196
274	12.5	7.309681	-44.6098	12.5	4.719467	-59.2002
274	0.862069	-4.32825	-48.9381	5.172414	-2.60812	-61.8083
274	3.321033	-1.86929	-50.8073	5.442804	-2.33773	-64.146
274	2.849003	-2.34132	-53.1487	4.91453	-2.866	-67.012
274	5.454545	0.264226	-52.8844	7.272727	-0.50781	-67.5198
274	3.278689	-1.91163	-54.7961	8.196721	0.416188	-67.1036
274	0	-5.19032	-59.9864	0	-7.78053	-74.8842
274	2.427184	-2.76313	-62.7495	3.771471	-4.00906	-78.8932
274	8.737864	3.547545	-59.202	11.65049	3.869952	-75.0233
274	1.546698	-3.64362	-62.8456	2.320048	-5.46049	-80.4838
274	11.32075	6.130436	-56.7152	13.20755	5.427014	-75.0567
274	6.302935	1.112616	-55.6025	10.00591	2.225376	-72.8314
274	0.163319	-5.027	-60.6295	0.277642	-7.50289	-80.3343
274	1.639344	-3.55097	-64.1805	1.639344	-6.14119	-86.4754
277	6.991525	1.801206	-62.3793	10.59322	2.812687	-83.6628
279	8.588661	3.398342	-58.981	12.11098	4.330444	-79.3323
280	4.863764	-0.32656	-59.3075	6.569901	-1.21063	-80.5429
281	8.651951	3.461632	-55.8459	13.30311	5.522581	-75.0204
281	12.35761	7.167292	-48.6786	17.81153	10.031	-64.9894
281	6.924266	1.733947	-46.9447	10.66461	2.884073	-62.1053
281	5.447471	0.257152	-46.6875	8.724933	0.9444	-61.1609
281	6.553367	1.363048	-45.3245	9.939488	2.158955	-59.0019
282	6.891441	1.701122	-43.6233	11.1671	3.386566	-55.6154
282	9.267735	4.077416	-39.5459	14.6167	6.836172	-48.7792
282	9.090909	3.90059	-35.6453	9.090909	1.310376	-47.4688
282	8.881579	3.69126	-31.9541	12.5	4.719467	-42.7494
282	7.531723	2.341404	-29.6127	13.05772	5.277183	-37.4722

Tetricus I Mint I UK hoards continued

282	7.929227	2.738908	-26.8738	12.71298	4.932442	-32.5397
284	8.722501	3.532182	-23.3416	13.81706	6.036526	-26.5032
286	8.770917	3.580598	-19.761	13.44489	5.66436	-20.8389
287	0	-5.19032	-24.9513	0	-7.78053	-28.6194
289	20.58695	15.39663	-9.55466	25.08714	17.30661	-11.3128
292	8.040936	2.850617	-6.70405	12.2807	4.500169	-6.81261
294	1.04712	-4.1432	-10.8472	1.570681	-6.20985	-13.0225
296	13.13068	7.940364	-2.90688	18.09592	10.31538	-2.70707
296	8.02435	2.834031	-0.07285	13.00498	5.224448	2.517374
395	5.263158	0.072839	-1.3E-05	5.263158	-2.51738	-1.5E-06
mean	5.190319			7.780533		
sd	4.441311			6.093483		
count	52			52		
error	0.615899			0.845014		

Tetricus I Mint 2 UK hoards

Date last coin	M2 - 2			M2 - 3		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
272	0	-0.06005	-0.06005	0	-0.80635	-0.80635
272	0	-0.06005	-0.1201	5.263158	4.456811	3.650464
272	0	-0.06005	-0.18016	2.564103	1.757756	5.408219
272	0	-0.06005	-0.24021	0	-0.80635	4.601872
273	0	-0.06005	-0.30026	0	-0.80635	3.795525
273	0.125945	0.065893	-0.23437	0.440806	-0.36554	3.429985
273	0.216606	0.156554	-0.07781	1.913357	1.10701	4.536995
273	0	-0.06005	-0.13786	0.767085	-0.03926	4.497733
273	0.152207	0.092155	-0.04571	1.826484	1.020137	5.51787
273	0	-0.06005	-0.10576	0	-0.80635	4.711523
273	0	-0.06005	-0.16581	0	-0.80635	3.905176
273	0.294985	0.234933	0.069119	1.769912	0.963565	4.868741
273	0.194175	0.134123	0.203242	0.970874	0.164527	5.033267
274	0.143472	0.08342	0.286662	1.07604	0.269693	5.30296
274	0.005459	-0.05459	0.23207	0.151044	-0.6553	4.647657
274	0.125471	0.065419	0.297488	0.376412	-0.42994	4.217722
274	0	-0.06005	0.237436	0	-0.80635	3.411375
274	0	-0.06005	0.177384	0	-0.80635	2.605028
274	0.113766	0.053714	0.231098	2.047782	1.241435	3.848462
274	0	-0.06005	0.171046	0	-0.80635	3.040115
274	0	-0.06005	0.110994	0	-0.80635	2.233768
274	0.184502	0.12445	0.235444	0.922509	0.116162	2.34993
274	0	-0.06005	0.175392	0.42735	-0.379	1.970934
274	0	-0.06005	0.11534	0.909091	0.102744	2.073678
274	0	-0.06005	0.055288	0	-0.80635	1.267331
274	0	-0.06005	-0.00476	0	-0.80635	0.460984
274	0.056012	-0.00404	-0.0088	0.914862	0.108515	0.569499
274	0	-0.06005	-0.06886	0	-0.80635	-0.23685
274	0.059488	-0.00056	-0.06942	0.951814	0.145467	-0.09138
274	0	-0.06005	-0.12947	0	-0.80635	-0.89773
274	0.019697	-0.04036	-0.16983	0.512113	-0.29423	-1.19196
274	0.065327	0.005275	-0.16455	0.783929	-0.02242	-1.21438
274	0	-0.06005	-0.2246	0	-0.80635	-2.02073
277	0	-0.06005	-0.28466	0.423729	-0.38262	-2.40334
279	0	-0.06005	-0.34471	0.554885	-0.25146	-2.65481
280	0.254647	0.194595	-0.15011	1.629743	0.823396	-1.83141
281	0.078833	0.018781	-0.13133	1.064249	0.257902	-1.57351
281	0.207111	0.147059	0.015727	1.415257	0.60891	-0.9646
281	0.030912	-0.02914	-0.01341	1.14374	0.337393	-0.6272
281	0.044897	-0.01516	-0.02857	0.718348	-0.088	-0.7152
281	0.12875	0.068698	0.04013	1.017124	0.210777	-0.50443
282	0.074102	0.01405	0.054179	1.311597	0.50525	0.000823
282	0.028604	-0.03145	0.022732	0.858124	0.051777	0.0526
282	0	-0.06005	-0.03732	0	-0.80635	-0.75375
282	0	-0.06005	-0.09737	1.315789	0.509442	-0.2443
282	0.081867	0.021815	-0.07556	0.900532	0.094185	-0.15012

Tetricus I Mint 2 UK hoards continued

282	0.065531	0.005479	-0.07008	1.179554	0.373207	0.223088
284	0.270166	0.210114	0.140035	0.964878	0.158531	0.381619
286	0.057703	-0.00235	0.137686	1.067513	0.261166	0.642785
287	0	-0.06005	0.077634	0	-0.80635	-0.16356
289	0.05427	-0.00578	0.071852	1.079129	0.272782	0.10922
292	0	-0.06005	0.0118	1.608187	0.80184	0.91106
294	0	-0.06005	-0.04825	0	-0.80635	0.104713
296	0.0624	0.002348	-0.0459	1.484222	0.677875	0.782588
296	0.166021	0.105969	0.060065	0.830105	0.023758	0.806346
395	0	-0.06005	0.000013	0	-0.80635	-7.9E-07
mean	0.060052			0.806347		
sd	0.081455			0.893984		
count	56			56		
error	0.010885			0.119464		

Tetricus I Mint 2 UK hoards continued

Date last coin	M2 - 4			M2 - 5		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
272	0	-0.28002	-0.28002	0	-1.38272	-1.38272
272	0	-0.28002	-0.56005	0	-1.38272	-2.76545
272	0	-0.28002	-0.84007	0	-1.38272	-4.14817
272	0	-0.28002	-1.1201	0.483092	-0.89963	-5.0478
273	0	-0.28002	-1.40012	0	-1.38272	-6.43053
273	0.125945	-0.15408	-1.5542	1.38539	0.002666	-6.42786
273	0.884477	0.604453	-0.94975	3.718412	2.335688	-4.09217
273	0.13947	-0.14055	-1.0903	0.453278	-0.92945	-5.02162
273	0.304414	0.02439	-1.06591	2.739726	1.357002	-3.66462
273	0	-0.28002	-1.34593	0	-1.38272	-5.04734
273	0	-0.28002	-1.62596	0	-1.38272	-6.43007
273	0.884956	0.604932	-1.02103	3.244838	1.862114	-4.56795
273	1.359223	1.079199	0.058172	3.68932	2.306596	-2.26136
274	0.35868	0.078656	0.136828	2.654232	1.271508	-0.98985
274	0.058234	-0.22179	-0.08496	0.247493	-1.13523	-2.12508
274	0.439147	0.159123	0.074161	2.38394	1.001216	-1.12386
274	0	-0.28002	-0.20586	1.111111	-0.27161	-1.39548
274	0	-0.28002	-0.48589	0.502513	-0.88021	-2.27569
274	0.113766	-0.16626	-0.65215	0.796359	-0.58636	-2.86205
274	0	-0.28002	-0.93217	0	-1.38272	-4.24478
274	0.431034	0.15101	-0.78116	0.431034	-0.95169	-5.19647
274	0.184502	-0.09552	-0.87668	1.752768	0.370044	-4.82642
274	0	-0.28002	-1.15871	0.42735	-0.95537	-5.7818
274	0	-0.28002	-1.43673	1.818182	0.435458	-5.34634
274	0	-0.28002	-1.71675	0	-1.38272	-6.72906
274	1.282051	1.002027	-0.71473	0.641026	-0.7417	-7.47076
274	0.336072	0.056048	-0.65868	3.005975	1.623251	-5.84751
274	0	-0.28002	-0.9387	0	-1.38272	-7.23023
274	0.416419	0.136395	-0.80231	1.963117	0.580393	-6.64984
274	0	-0.28002	-1.08233	5.660377	4.277653	-2.37219
274	0.41363	0.133606	-0.94873	1.398464	0.01574	-2.35645
274	0.212314	-0.06771	-1.01644	1.175894	-0.20683	-2.56328
274	0	-0.28002	-1.29646	0	-1.38272	-3.946
277	0	-0.28002	-1.57648	1.271186	-0.11154	-4.05754
279	0.241255	-0.03877	-1.61525	0.916767	-0.46596	-4.5235
280	0.993125	0.713101	-0.90215	3.81971	2.436986	-2.08651
281	0.315333	0.035309	-0.86684	1.675207	0.292483	-1.79403
281	0.44874	0.168716	-0.69813	2.03659	0.653866	-1.14016
281	0.401855	0.121831	-0.5763	1.329212	-0.05351	-1.19367
281	0.119725	-0.1603	-0.7366	1.197246	-0.18548	-1.37915
281	0.579374	0.29935	-0.43725	1.982748	0.600024	-0.77913
282	0.414969	0.134945	-0.3023	2.141534	0.75881	-0.02032
282	0.286041	0.006017	-0.29628	1.372998	-0.00973	-0.03004
282	0	-0.28002	-0.57631	0	-1.38272	-1.41277
282	0.328947	0.048923	-0.52738	1.315789	-0.06693	-1.4797
282	0.532133	0.252109	-0.27528	2.455997	1.073273	-0.40643

Tetricus I Mint 2 UK hoards continued

282	0.393185	0.113161	-0.16211	2.555701	1.172977	0.766547
284	0.308761	0.028737	-0.13338	1.543805	0.161081	0.927629
286	0.34622	0.066196	-0.06718	2.019619	0.636895	1.564524
287	0	-0.28002	-0.34721	0	-1.38272	0.1818
289	0.388236	0.108212	-0.23899	2.270972	0.888248	1.070048
292	0.584795	0.304771	0.065778	1.461988	0.079264	1.149312
294	0.52356	0.243536	0.309314	0	-1.38272	-0.23341
296	0.254056	-0.02597	0.283346	1.448565	0.065841	-0.16757
296	0.276702	-0.00332	0.280024	2.933038	1.550314	1.382743
395	0	-0.28002	-1.0E-07	0	-1.38272	0.000019
mean	0.280024			1.382724		
sd	0.320043			1.260989		
count	56			56		
error	0.042768			0.168507		

Tetricus I Mint 2 UK hoards continued

Date last coin	M2 - 6			M2 - 6 (incl Tet 2)		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
272						
272						
272						
272						
273	0	-1.8117	-1.8117	0	-3.48414	-3.48414
273	0.062972	-1.74873	-3.56043	0.692695	-2.79144	-6.27557
273	1.425993	-0.38571	-3.94613	5.270758	1.786623	-4.48895
273	0	-1.8117	-5.75783	0.069735	-3.4144	-7.90335
273	0.456621	-1.35508	-7.11291	1.217656	-2.26648	-10.1698
273	0	-1.8117	-8.92461	0	-3.48414	-13.654
273	5.882353	4.070653	-4.85396	8.823529	5.339394	-8.31457
273	4.424779	2.613079	-2.24088	7.964602	4.480467	-3.8341
273	0	-1.8117	-4.05258	0	-3.48414	-7.31824
274	0.286944	-1.52476	-5.57734	1.578192	-1.90594	-9.22418
274	0.469509	-1.34219	-6.91953	0.878965	-2.60517	-11.8294
274	0.815558	-0.99614	-7.91567	2.070263	-1.41387	-13.2432
274	4.62963	2.81793	-5.09774	6.851852	3.367717	-9.87551
274	0	-1.8117	-6.90944	1.675042	-1.80909	-11.6846
274	0.113766	-1.69793	-8.60738	0.796359	-2.68778	-14.3724
274	6.25	4.4383	-4.16908	6.25	2.765865	-11.6065
274	0.431034	-1.38067	-5.54974	5.064655	1.58052	-10.026
274	1.752768	-0.05893	-5.60867	2.583026	-0.90111	-10.9271
274	1.780627	-0.03107	-5.63975	2.136752	-1.34738	-12.2745
274	0	-1.8117	-7.45145	0	-3.48414	-15.7586
274	0	-1.8117	-9.26315	4.918033	1.433898	-14.3247
274	0	-1.8117	-11.0748	2.564103	-0.92003	-15.2448
274	0.560119	-1.25158	-12.3264	1.194922	-2.28921	-17.534
274	0	-1.8117	-14.1381	0.970874	-2.51326	-20.0472
274	1.546698	-0.265	-14.4031	3.152885	-0.33125	-20.3785
274	7.54717	5.73547	-8.66766	7.54717	4.063035	-16.3154
274	2.107544	0.295844	-8.37182	4.155998	0.671863	-15.6436
274	0.081659	-1.73004	-10.1019	0.310305	-3.17383	-18.8174
274	0	-1.8117	-11.9136	0	-3.48414	-22.3015
277	1.483051	-0.32865	-12.2422	3.177966	-0.30617	-22.6077
279	2.147165	0.335465	-11.9067	4.463209	0.979074	-21.6286
280	6.264324	4.452624	-7.45412	10.66972	7.185587	-14.4431
281	3.646039	1.834339	-5.61978	6.56287	3.078735	-11.3643
281	0.379703	-1.432	-7.05177	2.48533	-0.99881	-12.3631
281	2.689335	0.877635	-6.17414	5.03864	1.554505	-10.8086
281	1.361868	-0.44983	-6.62397	2.84346	-0.64067	-11.4493
281	3.077121	1.265421	-5.35855	5.742243	2.258108	-9.19118
282	3.341979	1.530279	-3.82827	6.061504	2.577369	-6.61382
282	1.744851	-0.06685	-3.89512	3.089245	-0.39489	-7.00871
282	0	-1.8117	-5.70682	0	-3.48414	-10.4928
282	2.302632	0.490932	-5.21589	4.605263	1.121128	-9.37171
282	2.74253	0.93083	-4.28506	5.36226	1.878125	-7.49359

Tetricus I Mint 2 UK hoards continued

282	3.899083	2.087383	-2.19768	7.241153	3.757018	-3.73657
284	2.006947	0.195247	-2.00243	4.052489	0.568354	-3.16822
286	3.115984	1.304284	-0.69815	5.193306	1.709171	-1.45904
287	0	-1.8117	-2.50985	0	-3.48414	-4.94318
289	3.304181	1.492481	-1.01736	6.042706	2.558571	-2.38461
292	3.80117	1.98947	0.972105	6.140351	2.656216	0.271608
294	0	-1.8117	-0.83959	1.04712	-2.43701	-2.16541
296	2.179533	0.367833	-0.47176	5.31289	1.828755	-0.33665
296	4.095185	2.283485	1.811724	7.304925	3.82079	3.484139
395	0	-1.8117	0.000024	0	-3.48414	3.9E-06
mean	1.8117			3.484135		
sd	1.973741			2.799245		
count	52			52		
error	0.273709			0.388185		

Tetricus I Mint 2 UK hoards continued

Date last coin	M2 - 5or6			M2 - 5/6/Tet 2		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
272	0	-1.59051	-1.59051	0	-6.50807	-6.50807
272	0	-1.59051	-3.18102	0	-6.50807	-13.0161
272	2.564103	0.973591	-2.20743	2.564103	-3.94397	-16.9601
272	0	-1.59051	-3.79795	0	-6.50807	-23.4682
273	0.694444	-0.89607	-4.69401	0.694444	-5.81363	-29.2818
273	0.440806	-1.14971	-5.84372	1.196474	-5.3116	-34.5934
273	2.490975	0.900463	-4.94326	9.187726	2.679652	-31.9138
273	0.27894	-1.31157	-6.25483	0.348675	-6.1594	-38.0732
273	1.065449	-0.52506	-6.77989	2.739726	-3.76835	-41.8415
273	0	-1.59051	-8.3704	0	-6.50807	-48.3496
273	0	-1.59051	-9.96092	14.70588	8.197808	-40.1518
273	0	-1.59051	-11.5514	12.38938	5.881307	-34.2705
273	0	-1.59051	-13.1419	0	-6.50807	-40.7786
274	2.080344	0.489832	-12.6521	3.945481	-2.56259	-43.3411
274	0.387618	-1.20289	-13.855	1.736092	-4.77198	-48.1131
274	1.380176	-0.21034	-14.0653	4.265997	-2.24208	-50.3552
274	0	-1.59051	-15.6558	11.48148	4.973407	-45.3818
274	2.680067	1.089555	-14.5663	4.355109	-2.15297	-47.5348
274	0	-1.59051	-16.1568	0.910125	-5.59795	-53.1327
274	0	-1.59051	-17.7473	12.5	5.991926	-47.1408
274	0.431034	-1.15948	-18.9068	5.926724	-0.58135	-47.7221
274	0.461255	-1.12926	-20.0361	4.797048	-1.71103	-49.4332
274	0	-1.59051	-21.6266	3.917379	-2.5907	-52.0239
274	0	-1.59051	-23.2171	0	-6.50807	-58.5319
274	0	-1.59051	-24.8076	4.918033	-1.59004	-60.122
274	1.282051	-0.30846	-25.116	3.846154	-2.66192	-62.7839
274	1.008215	-0.5823	-25.6983	2.763256	-3.74482	-66.5287
274	4.854369	3.263857	-22.4345	5.825243	-0.68283	-67.2115
274	1.368233	-0.22228	-22.6568	6.087817	-0.44026	-67.6518
274	7.54717	5.956658	-16.7001	22.64151	16.13344	-51.5184
274	2.659051	1.068539	-15.6316	8.922592	2.414518	-49.1038
274	0.555283	-1.03523	-16.6668	0.947248	-5.56083	-54.6647
274	1.639344	0.048832	-16.618	1.639344	-4.86873	-59.5334
277	1.271186	-0.31933	-16.9373	5.932203	-0.57587	-60.1093
279	2.219542	0.62903	-16.3083	8.829916	2.321842	-57.7874
280	4.150751	2.560239	-13.748	21.0848	14.57672	-43.2107
281	3.429247	1.838735	-11.9093	13.63816	7.130081	-36.0806
281	1.587849	-0.00266	-11.912	4.452882	-2.05519	-38.1358
281	2.534776	0.944264	-10.9677	10.26275	3.754677	-34.3811
281	1.316971	-0.27354	-11.2412	5.522299	-0.98578	-35.3669
281	3.064246	1.473734	-9.7675	11.88361	5.375536	-29.9914
282	2.90478	1.314268	-8.45323	12.30826	5.800188	-24.1912
282	1.229977	-0.36053	-8.81376	6.064073	-0.444	-24.6352
282	3.030303	1.439791	-7.37397	3.030303	-3.47777	-28.113
282	3.289474	1.698962	-5.67501	10.19737	3.689294	-24.4237
282	1.432665	-0.15785	-5.83286	9.537454	3.02938	-21.3943

Tetricus I Mint 2 UK hoards continued

282	2.49017	0.899658	-4.9332	13.63041	7.122332	-14.272
284	2.624469	1.033957	-3.89924	8.683906	2.175832	-12.0961
286	2.827467	1.236955	-2.66229	11.13676	4.628683	-7.46744
287	4	2.409488	-0.2528	4	-2.50807	-9.97551
289	2.761485	1.170973	0.918174	12.10837	5.600298	-4.37521
292	2.339181	0.748669	1.666844	12.2807	5.772628	1.397413
294	0	-1.59051	0.076332	1.04712	-5.46095	-4.06354
296	4.639865	3.049353	3.125684	12.13229	5.624213	1.560673
296	0.05534	-1.53517	1.590513	11.45545	4.947377	6.50805
395	0	-1.59051	5.5E-07	0	-6.50807	-2.4E-05
mean	1.590512			6.508074		
sd	1.603472			5.462113		
count	56			56		
error	0.214273			0.729906		

Tetricus II Mint I UK hoards

Date last coin	T2 M1 - 4			T2 M1 - 5		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
272						
272						
272						
272						
273	0.694444	-3.81735	-3.81735	0	-2.59021	-2.59021
273	0.377834	-4.13396	-7.9513	0	-2.59021	-5.18043
273	5.216606	0.704816	-7.24649	0	-2.59021	-7.77064
273	0.27894	-4.23285	-11.4793	0	-2.59021	-10.3609
273	2.283105	-2.22868	-13.708	0	-2.59021	-12.9511
273	4	-0.51179	-14.2198	12	9.409786	-3.54128
273	2.941176	-1.57061	-15.7904	2.941176	0.350962	-3.19032
273	6.489676	1.977886	-13.8125	3.834808	1.244594	-1.94573
273	0.582524	-3.92927	-17.7418	0	-2.59021	-4.53594
274	1.506456	-3.00533	-20.7471	0.071736	-2.51848	-7.05442
274	1.01727	-3.49452	-24.2417	0.746119	-1.84409	-8.89851
274	2.070263	-2.44153	-26.6832	0	-2.59021	-11.4887
274	3.703704	-0.80809	-27.4913	2.777778	0.187564	-11.3012
274	5.695142	1.183352	-26.3079	3.685092	1.094878	-10.2063
274	1.706485	-2.80531	-29.1132	0.796359	-1.79385	-12.0001
274	12.5	7.98821	-21.125	0	-2.59021	-14.5904
274	12.39224	7.880451	-13.2446	4.310345	1.720131	-12.8702
274	2.583026	-1.92876	-15.1733	2.121771	-0.46844	-13.3387
274	0.783476	-3.72831	-18.9016	2.065527	-0.52469	-13.8634
274	2.727273	-1.78452	-20.6862	1.818182	-0.77203	-14.6354
274	8.196721	3.684931	-17.0012	4.918033	2.327819	-12.3076
274	1.923077	-2.58871	-19.5899	0	-2.59021	-14.8978
274	2.427184	-2.08461	-21.6745	1.344287	-1.24593	-16.1437
274	1.941748	-2.57004	-24.2446	2.912621	0.322407	-15.8213
274	2.676978	-1.83481	-26.0794	0.773349	-1.81686	-17.6382
274	5.660377	1.148587	-24.9308	1.886792	-0.70342	-18.3416
274	6.224148	1.712358	-23.2185	3.702974	1.11276	-17.2288
274	0.293974	-4.21782	-27.4363	0.114323	-2.47589	-19.7047
274	0	-4.51179	-31.9481	0	-2.59021	-22.2949
277	5.508475	0.996685	-30.9514	3.601695	1.011481	-21.2835
279	5.862485	1.350695	-29.6007	3.522316	0.932102	-20.3513
280	13.26713	8.755335	-20.8453	1.706137	-0.88408	-21.2354
281	6.838786	2.326996	-18.5184	4.651163	2.060949	-19.1745
281	5.937176	1.425386	-17.093	5.453918	2.863704	-16.3108
281	6.460587	1.948797	-15.1442	3.74034	1.150126	-15.1606
281	3.397186	-1.1146	-16.2588	3.277462	0.687248	-14.4734
281	6.566242	2.054452	-14.2043	3.386121	0.795907	-13.6775
282	7.010004	2.498214	-11.7061	4.275658	1.685444	-11.992
282	3.117849	-1.39394	-13.1	5.34897	2.758756	-9.23329
282	3.030303	-1.48149	-14.5815	0	-2.59021	-11.8235
282	2.960526	-1.55126	-16.1328	3.618421	1.028207	-10.7953
282	5.566926	1.055136	-15.0777	5.525993	2.935779	-7.85952

Tetricus II Mint I UK hoards continued

	282	7.830931	3.319141	-11.7585	4.783748	2.193534	-5.66599
	284	6.136627	1.624837	-10.1337	5.094558	2.504344	-3.16164
	286	6.405078	1.893288	-8.24039	4.673976	2.083762	-1.07788
	287	4	-0.51179	-8.75218	0	-2.59021	-3.66809
	289	7.384834	2.873044	-5.87914	4.500198	1.909984	-1.75811
	292	6.578947	2.067157	-3.81198	4.239766	1.649552	-0.10856
	294	0.52356	-3.98823	-7.80021	0.52356	-2.06665	-2.17521
	296	7.826707	3.314917	-4.4853	4.965234	2.37502	0.199808
	296	8.245711	3.733921	-0.75138	4.980631	2.390417	2.590225
	395	5.263158	0.751368	-7.6E-06	0	-2.59021	0.000011
mean		4.51179			2.590214		
sd		3.191519			2.380551		
count		52			52		
error		0.442584			0.330123		

Tetricus II Mint 2 UK hoards

Date last coin	T2 M2 - 6 %	diff from mean	cusum of diff
272			
272			
272			
272			
273	0	-1.67244	-1.67244
273	0.629723	-1.04271	-2.71515
273	3.844765	2.17233	-0.54282
273	0.069735	-1.6027	-2.14552
273	0.761035	-0.9114	-3.05692
273	0	-1.67244	-4.72935
273	2.941176	1.268741	-3.46061
273	3.539823	1.867388	-1.59322
273	0	-1.67244	-3.26566
274	1.291248	-0.38119	-3.64684
274	0.409456	-1.26298	-4.90982
274	1.254705	-0.41773	-5.32755
274	2.222222	0.549787	-4.77777
274	1.675042	0.002607	-4.77516
274	0.682594	-0.98984	-5.765
274	0	-1.67244	-7.43744
274	4.633621	2.961186	-4.47625
274	0.830258	-0.84218	-5.31843
274	0.356125	-1.31631	-6.63474
274	0	-1.67244	-8.30717
274	4.918033	3.245598	-5.06157
274	2.564103	0.891668	-4.16991
274	0.634802	-1.03763	-5.20754
274	0.970874	-0.70156	-5.9091
274	1.606187	-0.06625	-5.97535
274	0	-1.67244	-7.64778
274	2.048454	0.376019	-7.27176
274	0.228646	-1.44379	-8.71555
274	0	-1.67244	-10.388
277	1.694915	0.02248	-10.3655
279	2.316043	0.643608	-9.7219
280	4.405399	2.732964	-6.98894
281	2.916831	1.244396	-5.74454
281	2.105627	0.433192	-5.31135
281	2.349304	0.676869	-4.63448
281	1.481592	-0.19084	-4.82532
281	2.665122	0.992687	-3.83263
282	2.719526	1.047091	-2.78554
282	1.344394	-0.32804	-3.11359
282	0	-1.67244	-4.78602
282	2.302632	0.630197	-4.15582
282	2.61973	0.947295	-3.20853

Tetricus II Mint 2 UK hoards continued

282	3.342071	1.669636	-1.53889
284	2.045542	0.373107	-1.16579
286	2.077323	0.404888	-0.7609
287	0	-1.67244	-2.43333
289	2.738525	1.06609	-1.36724
292	2.339181	0.666746	-0.7005
294	1.04712	-0.62531	-1.32581
296	3.133357	1.460922	0.13511
296	3.20974	1.537305	1.672415
395	0	-1.67244	-2.0E-05
mean	1.672435		
sd	1.364591		
count	52		
error	0.189235		

Tetricus I Mint I French hoards

LAST COIN	M1 - 2			M1 - 3		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
274	0	-0.03273	-0.03273	3.642384	2.236133	2.236133
274	0	-0.03273	-0.06546	5.06392	3.657669	5.893802
274	0	-0.03273	-0.09819	0	-1.40625	4.487551
274	0	-0.03273	-0.13092	2.069886	0.663635	5.151186
274	0.046631	0.013901	-0.11702	2.961063	1.554812	6.705998
274	0.360685	0.327955	0.210936	2.07394	0.667689	7.373688
274	0	-0.03273	0.178206	1.737374	0.331123	7.704811
274	0.011416	-0.02131	0.156892	1.278539	-0.12771	7.577098
274	0	-0.03273	0.124162	3.197354	1.791103	9.368201
274	0	-0.03273	0.091432	1.294118	-0.11213	9.256068
274	0.07622	0.04349	0.134921	3.20122	1.794969	11.05104
274	0	-0.03273	0.102191	1.333333	-0.07292	10.97812
274	0.078658	0.045928	0.148119	1.861563	0.455312	11.43343
275	0	-0.03273	0.115389	0	-1.40625	10.02718
276	0	-0.03273	0.082659	0.38835	-1.0179	9.009278
276	0	-0.03273	0.049929	0.324412	-1.08184	7.927439
276	0	-0.03273	0.017199	3.404255	1.998004	9.925443
276	0	-0.03273	-0.01553	0	-1.40625	8.519192
279	0	-0.03273	-0.04826	0	-1.40625	7.112941
282	0.116453	0.083723	0.035462	3.476959	2.070708	9.183649
283	0.180505	0.147775	0.183237	1.466606	0.060355	9.244005
284	0.078616	0.045886	0.229124	0.786164	-0.62009	8.623917
289	0	-0.03273	0.196394	0.01502	-1.39123	7.232686
293	0	-0.03273	0.163664	0	-1.40625	5.826435
294	0	-0.03273	0.130934	0	-1.40625	4.420184
296	0	-0.03273	0.098204	0	-1.40625	3.013933
296	0	-0.03273	0.065474	0	-1.40625	1.607682
309	0	-0.03273	0.032744	0	-1.40625	0.201431
348	0	-0.03273	0.000014	1.204819	-0.20143	-9.7E-07
mean	0.03273			1.406251		
sd	0.076916			1.452978		
count	29			29		
error	0.014283			0.269811		

Tetricus I Mint I French hoards continued

LAST COIN	M1 - 4			M1 - 4 (incl Tet 2)		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
274	8.774834	3.622137	3.622137	14.23841	5.698664	5.698664
274	14.1616	9.008902	12.63104	17.51272	8.972975	14.67164
274	3.703704	-1.44899	11.18205	14.81481	6.275068	20.94671
274	6.187403	1.034706	12.21675	10.75006	2.210309	23.15701
274	10.49196	5.339259	17.55601	17.59151	9.051766	32.20878
274	7.123535	1.970838	19.52685	13.25518	4.715438	36.92422
274	5.575758	0.423061	19.94991	10.34343	1.803687	38.72791
274	4.589041	-0.56366	19.38625	7.408676	-1.13107	37.59684
274	9.040794	3.888097	23.27435	16.20728	7.66753	45.26436
274	6	0.847303	24.12165	9.764706	1.224959	46.48932
274	10.89939	5.746693	29.86835	16.76829	8.228546	54.71787
274	6.666667	1.51397	31.38232	9.333333	0.793586	55.51146
274	8.521238	3.368541	34.75086	13.73886	5.19911	60.71057
275	0	-5.1527	29.59816	0.33557	-8.20418	52.50639
276	1.359223	-3.79347	25.80469	1.941748	-6.598	45.90839
276	2.757502	-2.39519	23.40949	4.298459	-4.24129	41.6671
276	19.14894	13.99624	37.40573	29.3617	20.82196	62.48906
276	0	-5.1527	32.25303	0	-8.53975	53.94931
279	0	-5.1527	27.10034	0	-8.53975	45.40956
282	11.89486	6.742162	33.8425	20.22958	11.68983	57.09939
283	7.220217	2.06752	35.91002	11.41697	2.877221	59.97662
284	3.773585	-1.37911	34.53091	6.68239	-1.85736	58.11926
289	0.120156	-5.03254	29.49836	0.180234	-8.35951	49.75975
293	0	-5.1527	24.34567	0	-8.53975	41.22
294	0.091659	-5.06104	19.28463	0.091659	-8.44809	32.77191
296	0	-5.1527	14.13193	0	-8.53975	24.23216
296	0.030713	-5.12198	9.009948	0.061425	-8.47832	15.75384
309	0.090634	-5.06206	3.947886	0.120846	-8.4189	7.334941
348	1.204819	-3.94788	8.1E-06	1.204819	-7.33493	0.000013
mean	5.152697			8.539747		
sd	5.041365			7.93253		
count	29			29		
error	0.936158			1.473034		

Tetricus I Mint I French hoards continued

LAST COIN	M1 - 5			M1 - 5 (incl Tet 2)		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
274	0.331126	-3.52533	-3.52533	0.331126	-5.34558	-5.34558
274	0.012412	-3.84404	-7.36937	0.037235	-5.63947	-10.9851
274	7.407407	3.550955	-3.81841	7.407407	1.7307	-9.25435
274	6.254173	2.397721	-1.42069	9.681727	4.00502	-5.24933
274	11.41292	7.556465	6.135775	16.89205	11.21534	5.966009
274	8.656447	4.799995	10.93577	13.34536	7.668649	13.63466
274	5.494949	1.638497	12.57427	9.656566	3.979859	17.61452
274	3.664384	-0.19207	12.3822	5.947489	0.270782	17.8853
274	7.38699	3.530538	15.91274	11.02536	5.348651	23.23395
274	5.294118	1.437666	17.3504	8.117647	2.44094	25.67489
274	1.067073	-2.78938	14.56102	1.067073	-4.60963	21.06526
274	1.333333	-2.52312	12.03791	5.333333	-0.34337	20.72188
274	6.869428	3.012976	15.05088	10.30414	4.627436	25.34932
275	0.671141	-3.18531	11.86557	1.006711	-4.67	20.67932
276	1.294498	-2.56195	9.303617	1.877023	-3.79968	16.87964
276	0.729927	-3.12652	6.177092	0.892133	-4.78457	12.09506
276	19.14894	15.29248	21.46958	25.10638	19.42968	31.52474
276	0	-3.85645	17.61312	0	-5.67671	25.84803
279	2.941176	-0.91528	16.69785	2.941176	-2.73553	23.1125
282	8.318084	4.461632	21.15948	12.42722	6.75051	29.86301
283	9.499097	5.642645	26.80213	14.80144	9.124737	38.98775
284	2.437107	-1.41935	25.38278	4.402516	-1.27419	37.71356
289	0.225293	-3.63116	21.75162	0.300391	-5.37632	32.33724
293	0	-3.85645	17.89517	0	-5.67671	26.66053
294	0	-3.85645	14.03872	0.274977	-5.40173	21.25881
296	0	-3.85645	10.18227	0	-5.67671	15.5821
296	0.061425	-3.79503	6.387238	0.092138	-5.58457	9.997529
309	0.120846	-3.73561	2.651632	0.151057	-5.52565	4.471879
348	1.204819	-2.65163	-3.0E-07	1.204819	-4.47189	-8.6E-06
mean	3.856452			5.676707		
sd	4.587196			6.45957		
count	29			29		
error	0.851821			1.199512		

Tetricus I Mint 2 French hoards

LAST COIN	M2 - 2			M2 - 3			
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff	
274		0	-0.03368	-0.03368	0.496689	0.117085	0.117085
274	0.049646	0.015967	-0.01771	-0.01771	1.278391	0.898787	1.015872
274		0	-0.03368	-0.05139	0	-0.3796	0.636268
274		0	-0.03368	-0.08507	0.511907	0.132303	0.768572
274	0.058289	0.02461	-0.06046	-0.06046	0.676148	0.296544	1.065116
274	0.180343	0.146664	0.086204	0.086204	0.811542	0.431938	1.497054
274		0	-0.03368	0.052525	0.606061	0.226457	1.72351
274	0.011416	-0.02226	0.030261	0.030261	0.33105	-0.04855	1.674957
274		0	-0.03368	-0.00342	0.882029	0.502425	2.177381
274		0	-0.03368	-0.0371	0.117647	-0.26196	1.915424
274		0	-0.03368	-0.07078	0.609756	0.230152	2.145576
274		0	-0.03368	-0.10445	0	-0.3796	1.765972
274		0	-0.03368	-0.13813	1.022549	0.642945	2.408917
275		0	-0.03368	-0.17181	0	-0.3796	2.029313
276		0	-0.03368	-0.20549	0	-0.3796	1.649709
276		0	-0.03368	-0.23917	0.081103	-0.2985	1.351208
276		0	-0.03368	-0.27285	0.425532	0.045928	1.397136
276		0	-0.03368	-0.30653	0	-0.3796	1.017532
279		0	-0.03368	-0.34021	0	-0.3796	0.637928
282	0.066545	0.032866	-0.30734	-0.30734	0.99817	0.618566	1.256494
283	0.045126	0.011447	-0.29589	-0.29589	0.92509	0.545486	1.80198
284	0.550314	0.516635	0.220741	0.220741	0	-0.3796	1.422376
289	0.01502	-0.01866	0.202081	0.202081	0.030039	-0.34956	1.072811
293		0	-0.03368	0.168402	0	-0.3796	0.693207
294		0	-0.03368	0.134723	0	-0.3796	0.313603
296		0	-0.03368	0.101044	0	-0.3796	-0.066
296		0	-0.03368	0.067365	0	-0.3796	-0.4456
309		0	-0.03368	0.033686	0	-0.3796	-0.82521
348		0	-0.03368	7.1E-06	1.204819	0.825215	6.5E-06
mean	0.033679				0.379604		
sd	0.106093				0.433356		
count	29				29		
error	0.019701				0.080472		

Tetricus I Mint 2 French hoards continued

LAST COIN	M2 - 4			M2 - 5		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
274	0	-0.3089	-0.3089	1.324503	0.458299	0.458299
274	0.955691	0.646789	0.337887	3.748293	2.882089	3.340389
274	0	-0.3089	0.028985	0	-0.8662	2.474185
274	0.35611	0.047208	0.076192	0.77899	-0.08721	2.38697
274	0.442994	0.134092	0.210284	0.979249	0.113045	2.500016
274	0.541028	0.232126	0.44241	1.713255	0.847051	3.347067
274	0.282828	-0.02607	0.416336	0.606061	-0.26014	3.086923
274	0.159817	-0.14908	0.267251	0.821918	-0.04429	3.042637
274	0.441014	0.132112	0.399364	1.653804	0.7876	3.830237
274	0.235294	-0.07361	0.325756	0.705882	-0.16032	3.669915
274	0.685976	0.377074	0.70283	1.295732	0.429528	4.099443
274	2.666667	2.357765	3.060594	1.333333	0.467129	4.566572
274	0.550603	0.241701	3.302295	1.468275	0.602071	5.168643
275	0	-0.3089	2.993393	0.33557	-0.53063	4.638009
276	0.064725	-0.24418	2.749216	0.453074	-0.41313	4.22488
276	0.081103	-0.2278	2.521417	0.081103	-0.7851	3.439779
276	0.851064	0.542162	3.063579	3.404255	2.538051	5.97783
276	0	-0.3089	2.754677	0	-0.8662	5.111626
279	0	-0.3089	2.445775	0	-0.8662	4.245422
282	0.316087	0.007185	2.45296	1.963068	1.096864	5.342286
283	0.327166	0.018264	2.471224	1.500451	0.634247	5.976533
284	0	-0.3089	2.162322	0.786164	-0.08004	5.896493
289	0	-0.3089	1.85342	0.045059	-0.82115	5.075347
293	0	-0.3089	1.544518	0	-0.8662	4.209143
294	0	-0.3089	1.235616	0.091659	-0.77454	3.434598
296	0	-0.3089	0.926714	0	-0.8662	2.568394
296	0	-0.3089	0.617812	0	-0.8662	1.70219
309	0	-0.3089	0.30891	0.030211	-0.83599	0.866198
348	0	-0.3089	8.3E-06	0	-0.8662	-6.2E-06
mean	0.308902			0.866204		
sd	0.532654			0.983481		
count	29			29		
error	0.098911			0.182628		

Tetricus 1 Mint 2 French hoards continued

LAST COIN	M2 - 6			M2 - 6 (incl Tet 2)		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
274	4.470199	2.542059	2.542059	13.90728	10.26999	10.26999
274	0.198585	-1.72955	0.812504	2.085143	-1.55216	8.71783
274	0	-1.92814	-1.11564	3.703704	0.066405	8.784235
274	3.650122	1.721982	0.606346	4.273314	0.636015	9.42025
274	6.423409	4.495269	5.101615	7.356027	3.718728	13.13898
274	2.885482	0.957342	6.058957	5.500451	1.863152	15.00213
274	2.464646	0.536506	6.595464	4.20202	0.564721	15.56685
274	1.586758	-0.34138	6.254082	2.522831	-1.11447	14.45238
274	4.189636	2.261496	8.515578	7.607497	3.970198	18.42258
274	1.647059	-0.28108	8.234497	2.823529	-0.81377	17.60881
274	2.896341	0.968201	9.202698	8.536585	4.899286	22.5081
274	1.333333	-0.59481	8.607892	2.666667	-0.97063	21.53747
274	3.093865	1.165725	9.773616	5.165181	1.527882	23.06535
275	0.33557	-1.59257	8.181047	0.671141	-2.96616	20.09919
276	0.323625	-1.60452	6.576531	0.647249	-2.99005	17.10914
276	0.973236	-0.9549	5.621627	1.865369	-1.77193	15.33721
276	10.6383	8.710158	14.33179	14.04255	10.40525	25.74246
276	0	-1.92814	12.40365	0	-3.6373	22.10516
279	0	-1.92814	10.47551	0	-3.6373	18.46787
282	4.924305	2.996165	13.47167	8.085177	4.447878	22.91574
283	2.109657	0.181517	13.65319	3.90343	0.266131	23.18187
284	1.650943	-0.2772	13.37599	2.515723	-1.12158	22.0603
289	0.060078	-1.86806	11.50793	0.075098	-3.5622	18.4981
293	0	-1.92814	9.579789	0	-3.6373	14.8608
294	0	-1.92814	7.651649	0.824931	-2.81237	12.04843
296	0	-1.92814	5.723509	0	-3.6373	8.411132
296	0.030713	-1.89743	3.826082	0.030713	-3.60659	4.804545
309	0.030211	-1.89793	1.928153	0.060423	-3.57688	1.227669
348	0	-1.92814	0.000013	2.409639	-1.22766	8.9E-06
mean	1.92814			3.637299		
sd	2.460276			3.881933		
count	29			29		
error	0.456862			0.720857		

Tetricus I Mint 2 French hoards continued

LAST COIN	M2 - 5or6			M2 - 5/6/Tet 2		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
274	1.15894	0.12112	0.12112	19.53642	13.07866	13.07866
274	1.390096	0.352276	0.473396	3.673824	-2.78394	10.29471
274	0	-1.03782	-0.56442	3.703704	-2.75406	7.540651
274	0	-1.03782	-1.60224	7.923436	1.465669	9.00632
274	0	-1.03782	-2.64006	13.77944	7.321669	16.32799
274	1.983769	0.945949	-1.69411	10.3697	3.911935	20.23992
274	1.292929	0.255109	-1.43901	7.959596	1.501829	21.74175
274	0	-1.03782	-2.47683	4.109589	-2.34818	19.39358
274	2.094818	1.056998	-1.41983	13.89195	7.434184	26.82776
274	2.352941	1.315121	-0.10471	6.823529	0.365762	27.19352
274	5.564024	4.526204	4.421498	16.99695	10.53918	37.73271
274	1.333333	0.295513	4.717011	5.333333	-1.12443	36.60827
274	0	-1.03782	3.679191	8.259046	1.801279	38.40955
275	0	-1.03782	2.641371	1.006711	-5.45106	32.9585
276	0	-1.03782	1.603551	0.970874	-5.48689	27.4716
276	0.729927	-0.30789	1.295658	3.568532	-2.88923	24.58237
276	2.978723	1.940903	3.236562	27.65957	21.20181	45.78417
276	0	-1.03782	2.198742	0	-6.45777	39.32641
279	0	-1.03782	1.160922	0	-6.45777	32.86864
282	3.027782	1.989962	3.150884	16.03727	9.579498	42.44814
283	4.591606	3.553786	6.704671	6.385379	-0.07239	42.37575
284	0.393082	-0.64474	6.059932	4.559748	-1.89802	40.47773
289	0	-1.03782	5.022112	0.135176	-6.32259	34.15514
293	0	-1.03782	3.984292	0	-6.45777	27.69737
294	0	-1.03782	2.946472	0.824931	-5.63284	22.06454
296	0	-1.03782	1.908652	0	-6.45777	15.60677
296	0	-1.03782	0.870832	0.061425	-6.39634	9.21043
309	0	-1.03782	-0.16699	0.090634	-6.36713	2.843297
348	1.204819	0.166999	0.000012	3.614458	-2.84331	-1.2E-05
mean	1.03782			6.457767		
sd	1.482881			7.013533		
count	29			29		
error	0.275364			1.30238		

Tetricus II Mint I French hoards

LAST COIN	T2 M1 - 4			T2 M1 - 5		
	%	diff from mean	cusum of diff	%	diff from mean	cusum of diff
274	5.463576	2.076526	2.076526	0	-1.82026	-1.82026
274	3.351123	-0.03593	2.040599	0.024823	-1.79543	-3.61569
274	11.11111	7.724061	9.764661	0	-1.82026	-5.43594
274	4.562653	1.175603	10.94026	3.427554	1.607299	-3.82864
274	7.099557	3.712507	14.65277	5.479133	3.658878	-0.16977
274	6.13165	2.7446	17.39737	4.688909	2.868654	2.698889
274	4.767677	1.380627	18.778	4.161616	2.341361	5.04025
274	2.819635	-0.56742	18.21058	2.283105	0.46285	5.5031
274	7.166483	3.779433	21.99002	3.638368	1.818113	7.321213
274	3.764706	0.377656	22.36767	2.823529	1.003274	8.324488
274	5.868902	2.481852	24.84952	0	-1.82026	6.504233
274	2.666667	-0.72038	24.12914	4	2.179745	8.683978
274	5.217619	1.830569	25.95971	3.434714	1.614459	10.29844
275	0.33557	-3.05148	22.90823	0.33557	-1.48468	8.813752
276	0.582524	-2.80453	20.1037	0.582524	-1.23773	7.576021
276	1.540957	-1.84609	18.25761	0.162206	-1.65805	5.917972
276	10.21277	6.825716	25.08333	5.957447	4.137192	10.05516
276	0	-3.38705	21.69628	0	-1.82026	8.234909
279	0	-3.38705	18.30923	0	-1.82026	6.414654
282	8.33472	4.94767	23.2569	4.109133	2.288878	8.703533
283	4.196751	0.809701	24.0666	5.302347	3.482092	12.18562
284	2.908805	-0.47824	23.58835	1.965409	0.145154	12.33078
289	0.060078	-3.32697	20.26138	0.075098	-1.74516	10.58562
293	0	-3.38705	16.87433	0	-1.82026	8.765386
294	0	-3.38705	13.48728	0.274977	-1.54528	7.220088
296	0	-3.38705	10.10023	0	-1.82026	5.399833
296	0.030713	-3.35634	6.743893	0.030713	-1.78954	3.61029
309	0.030211	-3.35684	3.387055	0.030211	-1.79004	1.820247
348	0	-3.38705	4.8E-06	0	-1.82026	-8.3E-06
mean	3.38705			1.820255		
sd	3.318402			2.105462		
count	29			29		
error	0.616212			0.390974		

Tetricus II Mint 2 French hoards

T2 M2 - 6			
LAST COIN	%	diff from mean	cusum of diff
274	9.437086	7.727927	7.727927
274	1.886558	0.177399	7.905326
274	3.703704	1.994545	9.899871
274	0.623192	-1.08597	8.813904
274	0.932618	-0.77654	8.037363
274	2.614968	0.905809	8.943172
274	1.737374	0.028215	8.971387
274	0.936073	-0.77309	8.198301
274	3.417861	1.708702	9.907003
274	1.176471	-0.53269	9.374315
274	5.640244	3.931085	13.3054
274	1.333333	-0.37583	12.92957
274	2.071316	0.362157	13.29173
275	0.33557	-1.37359	11.91814
276	0.323625	-1.38553	10.53261
276	0.892133	-0.81703	9.715582
276	3.404255	1.695096	11.41068
276	0	-1.70916	9.70152
279	0	-1.70916	7.992361
282	3.160872	1.451713	9.444073
283	1.793773	0.084614	9.528687
284	0.86478	-0.84438	8.684308
289	0.01502	-1.69414	6.990168
293	0	-1.70916	5.281009
294	0.824931	-0.88423	4.396782
296	0	-1.70916	2.687623
296	0	-1.70916	0.978464
309	0.030211	-1.67895	-0.70048
348	2.409639	0.70048	-4.2E-06
mean	1.709159		
sd	2.049422		
count	29		
error	0.380568		

APPENDIX 5 - ORGANISATION OF THE ANTONINIANI OF POSTUMUS

The main reverse types of the base silver antoniniani of Postumus arranged by mint and issue. There is some duplication of the reverse types between the issues which may be resolved by referring to the Cunetio hoard publication. The terms officina A, B and C are followed here and identify distinct strands of production, albeit from the same mint. There are few recognised cross officina die duplicates.

MINT	ISSUE	"OFFICINA A"	"OFFICINA B"
TRIER	ISSUE 1	SALVS PROVINCIARVM	VICTORIA AVG
		HERC DEVSONIENSI	VIRTVS AVG
		LAETITIA AVG	HERCVLI MAGVSANO
		FIDES MILITVM	PM TRP COS II PP
	ISSUE 2	SALVS AVG	PM TRP COS III PP
		HERC PACIFERO	MINER FAVTR
		NEPTVNO REDVCI	VIRTVS AVG
			IOVI PROPVGNAT(ORI)
	ISSUE 3	PAX AVG	PM TRP III COS III PP
		FORTVNA REDVX	HERC DEVSONIENSI
		VICTORIA GERMANICA	SPEI PERPETUAE
		PROVIDENTIA AVG	FELICITASAVG
			MONETA AVG (uncertain "officina c")
	ISSUE 4	MERCVRIO FELICI	VIRTVS AVG
		INTERNVTIVS DEORVM	PIETAS AVG

ISSUE 4	SERAPI COMITI AVG	DIANAE REDVCI
continued	MARS VICTOR	DIANAE LVCIFER(A)E
	SALVS POSTVMI AVG	FIDES EXERCITVS
	SAECVLO FRVGIFERO	SALVS EXERCITI
	FORTVNA AVG	VBER(I)TAS AVG
	PAX AVGVSTI	VIRTVTI AVGVSTI

SAECVLI FELICITAS
(uncertain "officina c")

ISSUE 5	PAX AVG	IOVI STATORI
	PM TRP VIII COS III PP	HERCVLI ROMANO AVG
	REST(ITVTOR) ORBIS	ORIENS AVG
	CASTOR	REST(ITVTOR) GALLIAR
		IOVI CONSERVAT(ORI)

ISSUE 6	PAX AVG P/-/-	ORIENS AVG P/-/-
		COS III

ISSUE 7	PACATOR ORBIS	COS V
		IMP X COS V

COLOGNE

ISSUE 1	COL CL AGRIP COS III
	C C A A COS III
	IOVI VICTORI
	IOVI VICTORI C/A/-

ISSUE 2	PM TRP X COS V PP
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MILAN

VIRTVS AVG

FIDES (A)EQVIT

PAX EQVITVM

SALVS AVG

CONCORD (A)EQVIT

VIRTVS (A)EQVIT

VIRTVS EQVITVM

APPENDIX 5 - ORGANISATION OF THE ANTONINIANI OF VICTORINUS

The main reverse types of Victorinus arranged by mint and issue. There is some duplication of the reverse types between the issues which may be resolved by referring to the Cunetio hoard publication.

MINT / ISSUE	OBVERSE	REVERSE
TRIER		
ISSUE 1	IMP C M PIAVVONIVS VICTORINVS PF AVG	PAX AVG FIDES MILITVM
ISSUE 2	IMP C PIAV VICTORINVS PF AVG	PAX AVG COMES AVG FIDES MILITVM INVICTVS ORIENS AVG
ISSUE 3	IMP C VICTORINVS PF AVG or IMP CAES VICTORINVS PF AVG	PAX AVG INVICTVS
ISSUE 4	IMP C VICTORINVS PF AVG	VICTORIA AVG SAEC FELICITAS VIRTVS AVG LAETITIA AVG N
ISSUE 5	IMP C VICTORINVS PF AVG	SALVS AVG VIRTVS AVG

**MINT /
ISSUE**

OBVERSE

REVERSE

COLOGNE

ISSUE 1	IMP C PI VICTORINVS AVG	AEQVITAS AVG
ISSUE 2	IMP C VICTORINVS PF AVG	SALVS AVG
ISSUE 3	IMP C VICTORINVS PF AVG	PIETAS AVG
ISSUE 4	IMP C VICTORINVS PF AVG	VICTORIA AVG COMES AVG FORT REDVX MARS VICTOR
ISSUE 5	IMP C VICTORINVS PF AVG	PROVIDENTIA AVG

APPENDIX 6 - ORGANISATION OF THE ANTONINIANI OF TETRICUS I AND TETRICUS II

TETRICUS I

MINT / ISSUE	OBVERSE	REVERSE
TRIER		
ISSUE 1	IMP C G P ESVVIVS TETRICVS AVG	CONCORDIA AVG SPES PVBLICA VICTORIA AVG
ISSUE 2	IMP C G P ESV TETRICVS AVG	CONCORDIA AVG SPES PVBLICA VICTORIA AVG
ISSUE 3	IMP C TETRICVS PF AVG	CONCORDIA AVG SPES PVBLICA VICTORIA AVG
ISSUE 4	IMP C TETRICVS PF AVG	PAX AVG COMES AVG SALVS AVG
ISSUE 5	IMP C TETRICVS AVG or IMP TETRICVS PF AVG	VIRTVS AVGG MARS VICTOR SALVS AVGG HILARITAS AVGG

COLOGNE

ISSUE 1	IMP C G P ESVVIVS TETRICVS AVG	FIDES MILITVM
ISSUE 2	IMP C P ESV TETRICVS AVG	FIDES MILITVM

ISSUE 3	IMP TETRICVS AVG	FIDES MILITVM
ISSUE 4	IMP TETRICVS PF AVG	FIDES MILITVM
ISSUE 5	IMP TETRICVS PF AVG	LAETITIA AVG N
ISSUE 6	IMP TETRICVS PF AVG	LAETITIA AVGG

TETRICUS II

MINT / ISSUE	OBVERSE	REVERSE
TRIER		
ISSUE 4	C PIV ESV TETRICVS CAES	SPES PVBLICA PRINC IVVENT
ISSUE 5	C PIV ESV TETRICVS CAES	SPES AVGG NOBILITAS AVGG

COLOGNE

ISSUE 6	C PIV ESV TETRICVS CAES or C P E TETRICVS CAES	PIETAS AVGVSTOR PIETAS AVGG
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The minting of radiate base silver coins under the Tetrici poses some problems with the attribution of the HILARITAS AVGG and some of the SALVS AVGG issues of Tetricus I due to the apparent "cross mint" hybridisation of the obverse bust type, Trier normally using a draped and cuirassed bust and Cologne a cuirassed bust. There are also a number of hybrid reverse types used between the elder and younger Tetricus, for example, a number of PRINC IVVENT coins with the obverse of Tetricus I and a number of PAX AVG and COMES AVG coins with the bust of Tetricus II are commonly encountered.

