
AN OVERALL APPROACH ON THE ROMAN ECONOMY OF THE PROVINCE OF UPPER DACIA

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Abstract: The present paper is the extensive summary to my book, in Polish, on the economy of Upper Dacia.¹ The reason to publish such a summary was the possible high difficulty for the reader if he may not be able to read Polish language.

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The purpose of this work is to show the many aspects of economy in the region of Upper Dacia. The territorial span of this work corresponds to all the lands of this province, including the territories, which received the name of *Dacia Porolissensis*, as well as Western Transylvania that was incorporated to *Dacia Apulensis* after political changes. The choice of this territorial span has several reasons. First, it corresponds to the lands on which the most important researches on Dacian provinces were led. Studying the economy of this region is particularly interesting because it provides many information in order to understand Roman economy in general. Second, the present state of the researches on the Dacian provinces is very unequal. It is therefore impossible to analyse the question as a whole, for all the concerned territories: in many aspects, their research degrees and numbers of publications considerably differ from ours. The impossibility to distinguish most of the archaeological objects as anterior or posterior to the epoch of the exclusion of the mentioned territories of Upper Dacia does not permit us to restrict our research to a smaller region. This would also restrict the researches on their economy. The studied period begins with the conquest and the foundation of the Dacian provinces under Trajan and ends at the time of their final evacuation under Aurelian.

The latest monograph on the economy of Roman Dacia dates back to 1929. However this work by V. Christescu still represents a high scientific level, a real rush of discoveries were achieved in the meantime thanks to the enormous effort of the Romanian archaeologists, and they considerably enlarged the searchers' fields of action. This allowed incredible progress in the knowledge in this domain. Studies were achieved on a huge number of archaeological sites, among which civilian ones, military camps, gold mines, quarries, workshops, road tracks, and myriads of inscriptions, coins, pottery fragments and most various other items. We are aware that our analysis, being mainly based on published archaeological objects, omits some information, which unpublished objects could provide. However, taking into account the context of this work, we can assume that the „database” it is based on is sufficient to offer a synthetic image of the question. The purpose of this work is not to create a catalogue of all possible items imported to Dacia or

¹ ŻMUDZIŃSKI 2007.

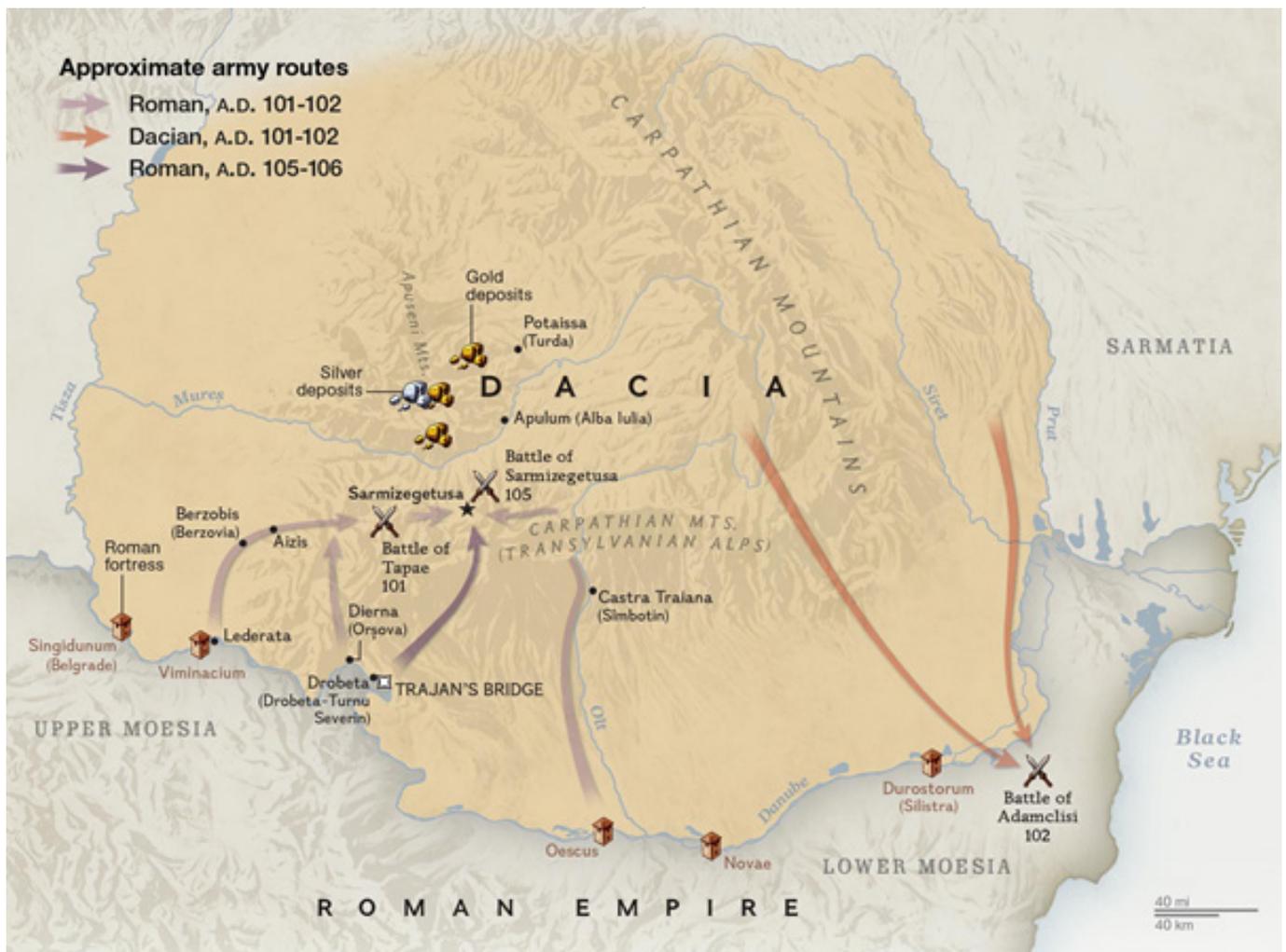


Fig.1. The Dacian wars, after <http://www.nationalgeographic.com/trajan-column/article.html>

tools used in this ancient region. We assume that the great research results that the Romanian scientists obtained allow us to try to throw a wider look on the Roman economy in the province of Upper Dacia, and to compare it to other parts of the Roman Empire.

The economic phenomena result in a high degree from political events. That is why, in order to understand better their deep causes, we present in the first part of this work a history of the province, and we put the stress on the main events, which could have influenced the economy. The first and most basic event was the Dacian wars. They eventually meant the decay of an independent kingdom and the foundation of a Roman province. They were caused by a feeling of threat of the Imperium, contrary interests in the Danube regions, and the conscience that a conquest would provide high profits. That is why the Romans considered it would be profitable to support the costs of a military campaign, and later to garrison there many troops and a whole administration.

In 117 AD, after the news of Trajan's death, there was a Sarmatian invasion. It was beaten off, but then Emperor Hadrian decided to give up some territories, economically poorer and more difficult to keep up. State structures of the province were also reorganised. The lands of the Banat and Central Transylvania became the province of Upper Dacia. In the South East, the remaining part of Transylvania

and Oltenia became the province of Lower Dacia. Around 119 AD, Upper Dacia was divided, and its northern region became a third province called *Dacia Porolissensis*. After two decades of peace, these territories suffered two Barbarian invasions (142-143 and 157-158), and a few years later, in 166 AD, the Marcomanic Wars began. These were linked with further, fiercely devastating invasions of Sarmatian Iazyges and Germanic tribes. As a consequence of the Marcomanic Wars, the Dacian provinces were reorganised one more time. Upper Dacia became *Dacia Apulensis*, and Lower Dacia, *Dacia Malvensis*. *Dacia Apulensis* corresponded to the former territories of Upper Dacia but was enlarged and included part of Eastern Transylvania, which previously belonged to Lower Dacia. The region of Banat was probably attached, too. The present state of researches does not allow to accurately marking the border of *Dacia Malvensis*. In 213-214 DC, Emperor Caracalla visited Dacia. The event was linked with a reinforcement of the province's defence system. Other tragic events took place under Maximinus of Thrace. Although we have no detail information on the nature of them, Maximinus' new titles of *Sarmaticus* and *Dacicus Maximus* are most probably connected to them. His victory was one of the last military successes of the Romans in this region. Under Gordian III, the Danube provinces were attacked by the Goths and Carps. In 242 AD, the invaders even broke through the Danube defence line and probably reached

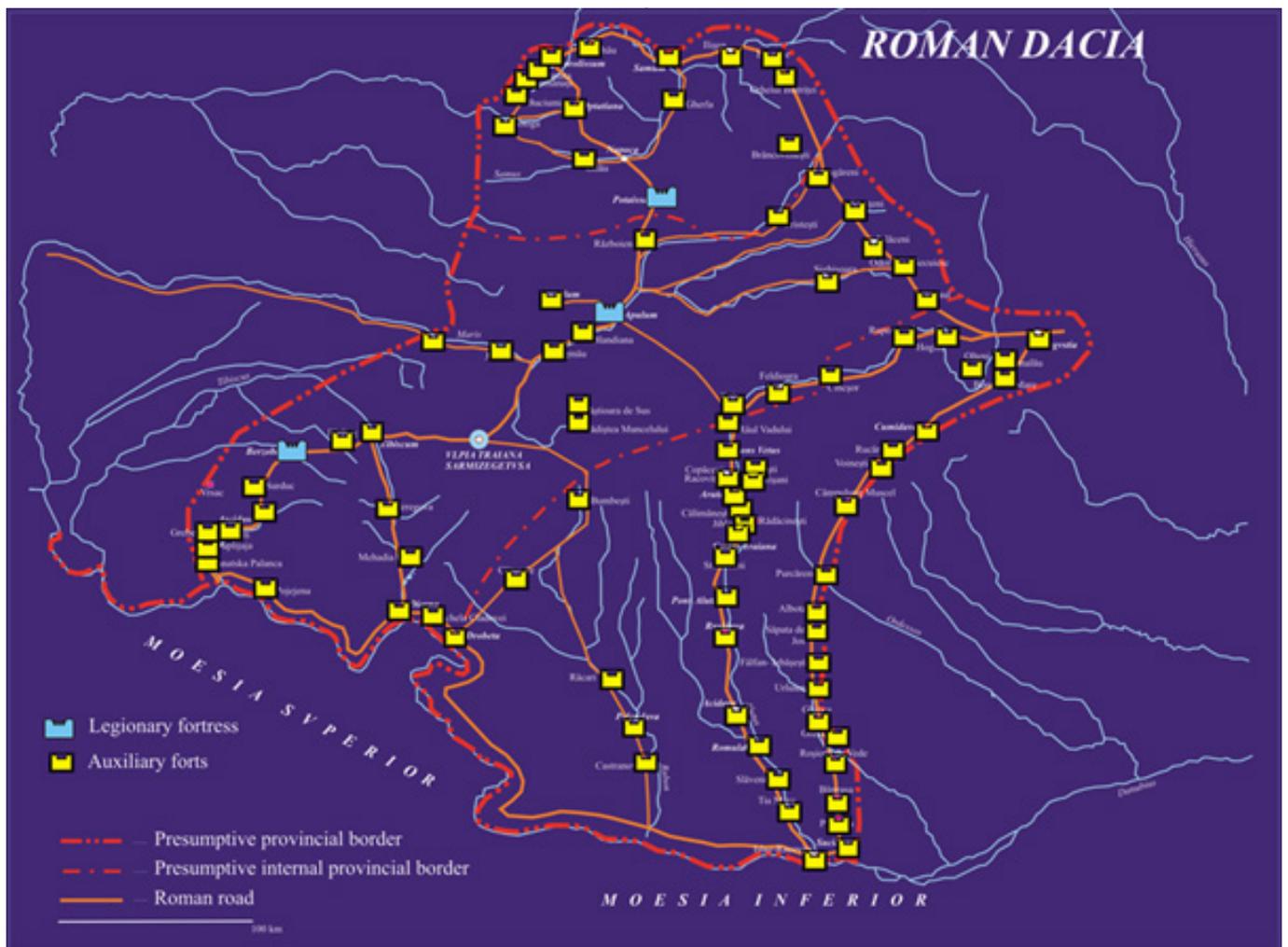


Fig. 2. The garrisons of Roman Dacia, © Cristian Găzdac

the South of the provinces, devastating *Dacia Malvensis* on their way. The defence was so weakened in the region that the Barbarian soon invaded it again successfully. Emperor Gordian III personally involved in the defence of the Danube provinces, which evidences how the situation was serious. In the region of Oltenia, devastation was so heavy that the Roman decided to give up the defence line on the Olt River. The devastated area spread up to the banks of the Black Sea and Thrace. After the situation was stabilised under Philip I, fortifications of Dacia were rebuilt starting from the South East part. However, battles also took place in Dacia under the next emperor, Decius. In 251 AD, a large army of Goths broke through the Danube *limes* and devastated Lower Moesia. The emperor died at the battle of *Abritus* when coming to rescue. This defeat weakened again the Roman domination in the Danube region, among which the Dacian provinces.

New Barbarian victories, difficulties to defend the whole territory, high upkeep of the provinces about the increasing precariousness of the profits they could draw from them forced the Romans to withdraw from their Danubian colonies. The first steps towards the evacuation of the province could already take place under Emperor Decius. Information about the long-lasting presence of Barbarians inside the borders of Dacia seems to testify that this region had already fallen into their hands. The present state of the researches does not permit to establish exactly how

the evacuation of the provinces was led. There are several hypotheses. However, it is impossible to fix the withdrawal date for the last Roman troops in Dacia; we know that this did not take place later than the end of Aurelian's reign. We can suppose that the process began in the middle of the century, and the last evacuation took place in 274 or 275. The whole administration withdrew together with the army. Most of the Romanised civilian population evacuated too. The evacuation of the provinces involved a series of consequences. The remaining population was cut from the Roman markets. The money flow dramatically decreased, and the artisans and tradesmen lost many profits. For the Romans, the loss of raw materials from these provinces was the most sensible. It forced them to develop mining in neighbouring regions. Another consequence of the Roman withdrawal from Dacia was the reinforcement of fortifications in the neighbouring Danubian provinces, in order to protect them against invasions from over the Danube.

These external political events also affected Upper Dacia and had consequences on its economy. This is particularly visible in the money market of this territory. However, the coins and treasures discovered nowadays are rare and probably represent an insignificant part of what really existed; their number allows observing a series of facts. Long before a Roman province was founded there, large amounts of coins were used in the country. The arrival of the Romans



Fig. 4. Some examples of coins issued after a conquest of Dacia

implied that Greek coins lost importance, and that Dacian coins were withdrawn and replaced by the invaders' coins. These were imported, distributed to the soldiers as salary, or introduced as *donativa*. This money was profitable for the

local market. The Roman law also was introduced in the country, and together with it, their economic practices like the hire, customs, tax paying and financial services. Unfortunately, the provinces' service market at this epoch is completely unknown. We can only suppose that services were provided there in a similar way than in the other regions of the empire. The monetisation of economy did not exclude thoroughly the use of barter, especially in the case of wages or loans in the countryside. In times of trouble on the financial markets, especially in case of hyperinflation, paying the soldiers in nature became a common practice. Gold coins are discovered very seldom. On the contrary, silver and bronze coins are found very frequently, because they were less precious for their owners. *Denarii* usually represent from 17.7 to 27.7% of all discovered coins. A major change took place under

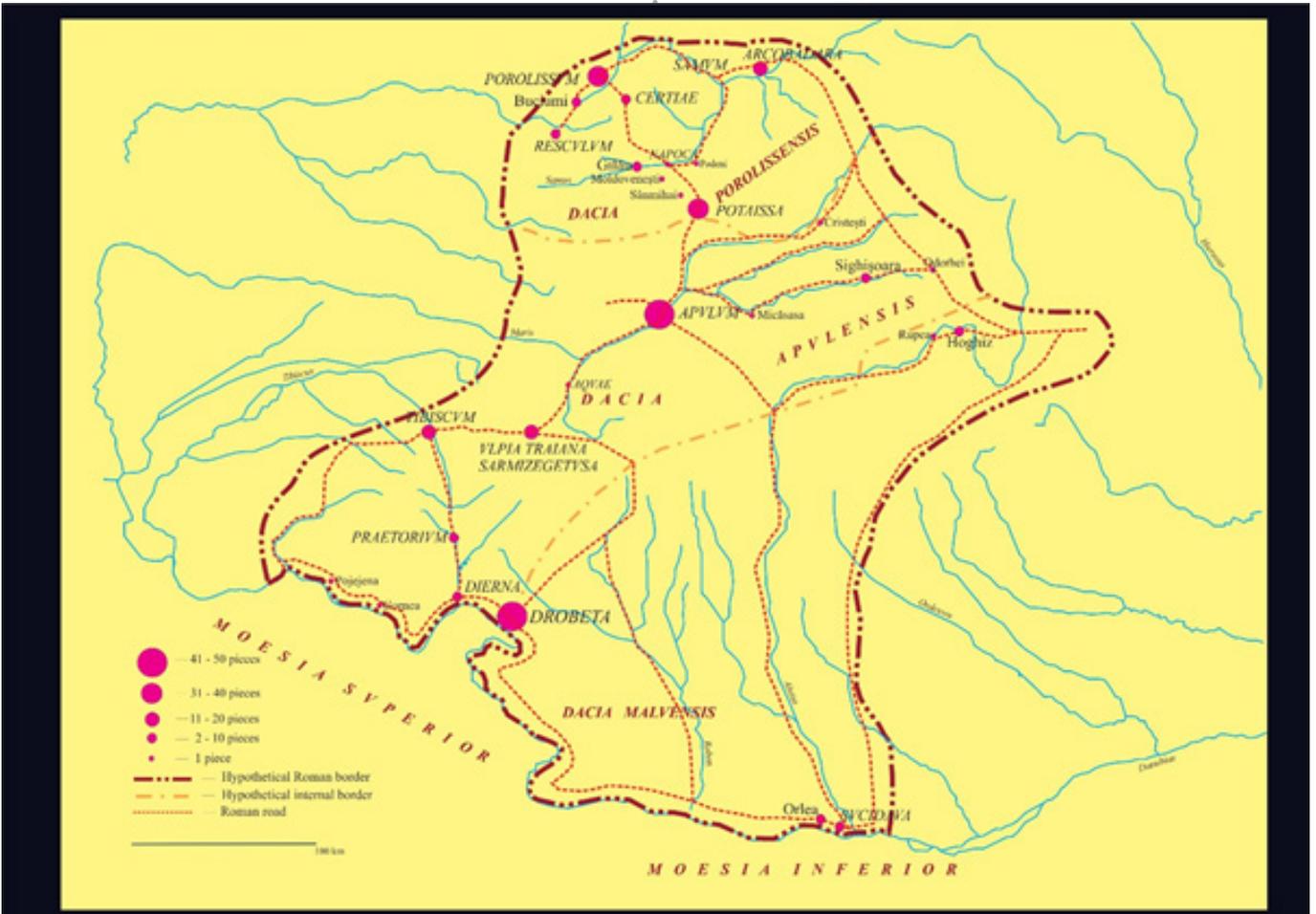


Fig. 5. Coin finds of PROVINCIA DACIA type, © Cristian Găzdac

Septimius Severus, who began to mint large low-grade silver coins series. This deeply disturbed the money market and involved far-reaching consequences in all the economy. The problem considerably worsened under Gordian III. The weakness of senate bronze coins was compensated with coins from local Greek mint workshops. Under the first successors of this emperor, the level of minted *denarii* largely decreased. From the reign of Gordian III, no *denarii* were minted any longer. They were replaced by *antoniniani*, which were much low-graded concerning their facial value. They were minted in order to increase the soldiers' salaries. Nevertheless, *antoniniani* slowly began to lose value too, as they contained fewer and fewer bronze. When Heliogabalus stopped producing them, their bronze percentage had reached down a poor 1.2%. Huge amounts of *antoniniani* have been discovered mainly on two archaeological sites: *Porolissum* (89.4% of all coins discovered there) and *Apulum* (93.9%). Their decay visibly took place under Philip I: they represent hardly 39% of the coins of this period. It is due to the introduction of new bronze coin series in *Provincia Dacia* in 246. These new coins were minted mainly for the Dacian province market. Coins from this province are often discovered in the analysed territories. These coin series were minted in order to satisfy the need for money for the army.

In the period of the decay, or perhaps during the slow evacuation of the province, and up to the time when it was completely evacuated, *antoniniani* were the only available coins on the money market. Among the silver coins with the effigies of the emperors of the second and third century, a number of local forged, silvered copies can be observed. At the top period of their production, between 193 and 218, they represented a 25.7% of the coins. Afterwards their number decreased down to a few percent, and under the reign of Gallienus, their production was stopped. They were clearly minted to serve for the local market. Most of the discovered coins of this kind were plated *denarii* minted under Severans (193-235). Their production ended because of the reintroduction of massive emissions of *antoniniani* in 238 and the progressive disappearance of silver coins from the markets about 260. The production of substitution coins, including *antoniniani*-like ones, and the flood of depreciated *antoniniani* on the market led to severe troubles on the money market. These crisis phenomena severely affected the whole goods and money economy. The presence of armies is also linked with the production of bronze *limesfalsa*, which are quite often discovered in far territories of the Roman Empire, especially in the border regions of the *limes*.

The most often discovered coins in Dacia, as well as in all the other provinces, are bronze coins, as they were the most frequently used in daily transactions. And the majority of known Dacian bronzes were minted in the 2nd century, in a central mint workshop Owing to the *Viminacium* workshop, sesterces reached for a time a level of 14,7% of the discovered coins. Sesterces from this province represent a 70.2% of the bronze coins issued by *Viminacium* in the analysed province, and are dated since the reign of Gordian III. Sesterces were the most frequent under Philip I, when they reached their top level of 42.1% of all the coins present on the money market in this period. Sesterces minted in *Provincia Dacia* also represent 73.9% of the total of this denomination

discovered in this region. They are found particularly often in ancient camps and bastion sites. The number of sesterces in circulation in Dacia progressively decreased. Beside the mentioned coins, minted as imperial emissions, a little number of coins officially minted in the provinces can be found on the territory of Dacia. Among them, there are coins produced in several Greek cities. They are usually discovered at civilian sites and, practically, they never appear in strongholds or military camps. In the 3rd century AD, the most important for local money market were local mints, such as *Viminacium* (Kostolac) in *Moesia Superior* (Serbia). *Provincia Dacia* coins of different denominations were most likely minted at *Apulum* (Alba Iulia). However, the mint *Viminacium* was most important provider for the bronze coins in circulation in the territory of Dacia, except for the reign of Philip I. It has been observed that the development of settlements was linked with a massive arrival of money. This is particularly visible in the period from Trajan to Antoninus Pius. The province was then considerably urbanised and received important deliveries of money from the imperial mint workshops. The decay corresponds to the Marcomanic Wars, when money deliveries and tax collecting could not be achieved any longer. That is how these serious political events directly influenced the money market on large areas of the provinces. On the contrary, an important increase can be observed in the times of Septimius Severus up to Philip I. It is linked to more abundant coin emissions as well as a development of the cities. The last period before the liquidation of the provinces shows a drop on the money market.

Up to year 2000, 135 Roman coin treasures have been discovered in the territories of ancient Dacia. Their important number allowed the numismatists to observe a series of regular rules. The most important treasures were buried under the reigns of mainly six emperors: Antoninus Pius, Alexander Severus, Balbinus, Gordian III, Philip the Arab and Gallienus. Many treasures can be associated with the troubled historical events, which we mentioned before. The discovered coins also show that Dacia experienced an economic boom under Severans: it has been observed, indeed, that the people who buried treasures were anxious about the real value of the coins gathered in the treasures: they usually did not hoard low face value coins, but the most precious, even expired ones. The discovered treasures show significant differences whether they were buried by civilians or by soldiers: contrarily to the civilians, the soldiers hid all kinds of coins they possessed when setting up their treasures.

The extraction industry, among which ore mining, was a clue branch of the economy of these territories. Apart from precious metals, the provinces provided copper, lead and enormous amounts of iron. Other branches of their extraction activities were stone quarries and salt mines. We can assume that the wealth of the region's mineral lodes certainly was one of the main reasons why Trajan invaded Dacia. When they arrived, the Romans found there a fully developed mine system. They began exploiting it very quickly. It is likely that the extracted ores were mainly exported to central mint workshops. The importance of gold in the mining industry of this period seems to be underlined in

the title of the local mine administrators called *procuratores aurarium*. Gold lodes were situated in the basin of the Arieş, Ampoi, Crişul Alb and Mureş rivers. The main extracting region was in the Apuseni Mountains. The main ancient cities of the analysed area were *Ampelum* (Zlatna), where the mine administration offices were situated, and *Alburnus Maior* (Roşia Montană), where an estimated minimum of 300 tons of gold and 3000 tons of silver were extracted. On this area, there were four neighbouring mining districts.

Depending on the geological conditions, the Ancients applied several extracting methods in Dacia, like gold sand washing, open-air mining or underground mining.

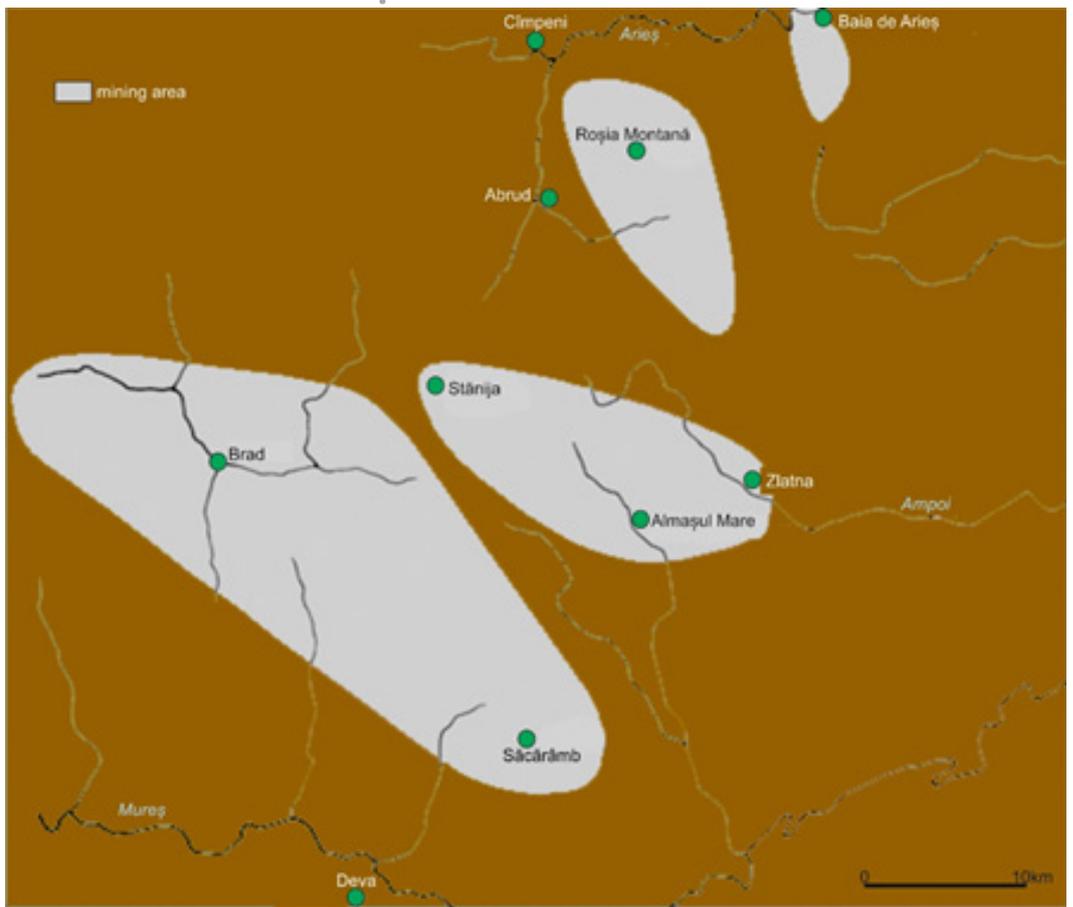


Fig. 6. Roman mining area in the Apuseni Mountains, based on WOLMANN 1996, LX

The discovered mine galleries usually have a trapezoidal section, though some rectangular can be met too. They often reach a depth of 150 to 400 m, and even 600 m sometimes. Ventilation ducts were dug between the access galleries. The galleries were dug with picks, or the stone was fire-crushed. In the gallery walls, lamp niches can be found. The use of lamps in those mines were initiated by the Romans. A whole series of such mines have been discovered in *Alburnus Maior* (Roşia Montană); some of them, in the hill of Cârnic, have a total gallery length over 70 km. Mine picks, hoes, axes and oil lamps are still found sporadically. In order to prevent the mines from being flooded, different installations were used: wooden canals were built to collect water and it was then evacuated with bucket chains, sometimes connected together in whole lines. To prevent galleries from crumbling, stone pillars were kept in certain places. Beams, or their fragments, or even their negative traces on the stone can be found too. They were used to strengthen the gallery ceilings or as pillars. Traces of ancient mining have been discovered in the surroundings of about 40 modern localities. On the territory of the analysed province, a series of miners' settlements have been attested, together with their graveyards where many inscriptions were discovered. Archaeological works in mines allow reconstituting ancient mining methods. It has been observed that mining was initiated at the top, or not far from the top of hills, and pits were dug downwards. After reaching the level of the gold lode, galleries were dug for gold extraction and ore transport. The corridors were placed in rays from a central pit, sometimes provided in parallel, or aligned one



Fig. 7. Shaft in a gold mine at Alburnus Maior

after another in the shape of a fan. In the case of extraction in an ore layer, the corridors were dug alongside the layer. It has been estimated that for each extracted ton of material, the miners obtained from 1 to 4.2 g of gold and from 3 to 4.2 g of silver. The remaining mines show the high professional level of the ancient miners. At the beginning, the searchers used to think that mineworkers were mainly slaves. However, slaves certainly played a major role in the Roman economy. Their work in the mines of the analysed province is rather seldom attested. On the contrary, we know that part of the crews were at least formed of people enrolled under work contract (they owed yearly about 210 *denarii* without food



Fig. 8. Roman mining shaft at Alburnus Maior, detail

or about 140 *denarii* with food). A group of imperial freed slaves working as mine administration employees has also been attested. The subsistent inscriptions testify that there existed mine concessions, and that the miners' settlements in the surroundings of *Alburnus Maior* were mainly inhabited by people of Illyrian origin. These settlers often belonged to the high-qualified crews.



Fig. 9. Gold chamber in an Alburnus Maior shaft

Besides precious metals, different iron ores were also extracted in the province, some of them containing up to 71.4% of metal. They were exploited even before the Roman conquest. Iron was necessary to the army and many other branches of the economy. That is why the Romans were seriously interested in the local iron lodes immediately after the conquest. The richest supplies were situated in the region of the present city of Hunedoara and in the Northeast border of the Poiana-Ruscăi Mountains. It is not excluded that extraction also took place in the surroundings of Gladna, Lunani, Rușchița and Densus. Iron was also exploited in the Banat region, near Ocna de Fier and Ciclova-Montană. The richest lodes were situated in two regions: in the Banat, in the valley of the Timiș river, and on the banks of the Mureș river, in the centre of the province. Remains of ancient iron mines have been discovered in the 19th century during mining works. They consisted in ancient mine pits where traces of tools were still visible. Besides the mines themselves, the



Fig. 10. Wooden axle of a wheel to pump up water from a gold mine at Alburnus Maior

remains of a building was discovered near Ghelari, in the surroundings of Hunedoara. It has been interpreted as an *officium*, that is a mine office, and next to it, there was a chapel. Apart from the underground mines, open air mines were also exploited in Upper Dacia during the analysed period. They were funnel-shaped. The iron ore extracting methods in Upper Dacia were similar to the ones known in other provinces. Unfortunately modern mining works have destroyed most of the ancient mine sites. Laboratory analyses attest that many items were produced with the iron extracted in this region. At present, we do not have concluding information about the forms of administration in those mines. We know however that certain *conductores ferrarium* worked in the analysed province, like for example *Gaius Gaurinus Gaurianus* and *Flavius Sotrius* from Teliucu Inferior. Both most probably had been granted a mine concession. Iron ore mines on the analysed territory were probably exploited under concessions, as it was the case in other provinces. However, it is difficult to establish how the mine-working crews looked like, thanks to inscriptions, we can suppose that soldiers and hired workers were in activity there, and sometimes probably convicts and slaves. Like in precious metals mines, it is possible that slaves could be employed in iron mine offices and even be their managers.

The analysed region is also very rich in different kinds

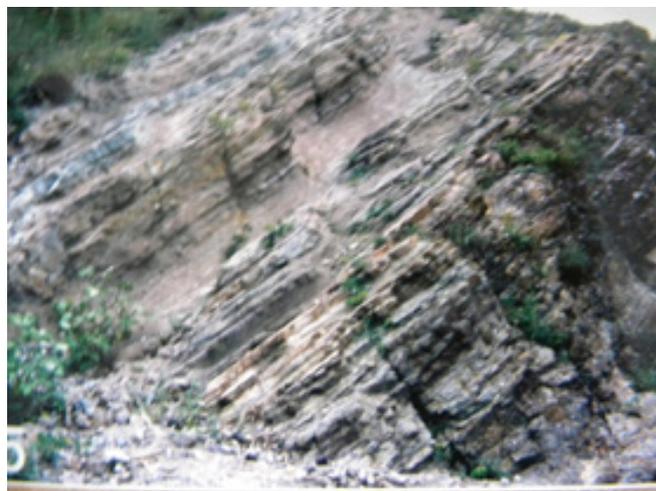


Fig. 11. Red rock with deposits of iron ore in Potaissa (Turda)

of rocks. Before the Roman conquest, stone was already one of the main building materials in the region. The Romans' arrival involved a huge development of this extraction branch. The Romans presence implied a development of military architecture unknown before and the building of fortifications. Urban architecture of all kind also developed. Most of those new building were made of local stones. Immediately after the foundation of the province, hundreds of kilometres of roads were also built. Their construction involved enormous quantities of stones. Many everyday use items were made of stone too. Many ancient quarries can be found on the analysed territories, as well as information about ancient quarries which have still been exploited in modern times. We know that there existed small quarries of local importance, but also much bigger ones which were able to supply with stone entire cities or complete fortification lines. It is highly probable that, as in other provinces, the Romans created quarries specialised in the extraction of particular raw materials for defined products, like mills or sarcophagi. In the analysed province, one of the biggest quarries was situated near *Ulpia Traiana Sarmizegetusa*; it provided the materials which the province's capital was built of. Another was near Deva and Simeria, and its stones were used to build the ancient settlement of *Micia* (Vețel). There was still another near Ighiu whose materials were used to build *Apulum*. More important quarries seem to be found near cities which were also military centres, like *Potaissa*, *Napoca* and *Porolissum*. It has been observed that the Romans used to continue extraction in Dacian quarries existing before their arrival. From time to time, old extraction tools can be found: iron or wooden wedges, chisels, picks, hammers, sledgehammers, bars, wooden sticks and stone hammers. When opening a quarry, the Romans took into account the using and aesthetic values of the stone, but also its possibilities of extraction and transport. Therefore, quarries were usually installed near the planned outlet market, and stone workshops near quarries. Quarries were usually installed at the top of hills, sometimes down in the valley. No traces of underground quarries have been found on the analysed territory. There were several methods of extraction: with wedges, with fire, and sometimes with hammers, though this method was the most work-demanding and thus probably seldom used. It is possible that extraction and transport were assisted by machines like cranes, special sledges or ground shuttles. We suppose that stones quarries worked under concession, like the other extraction branches. Soldiers were used in quarries supplying materials for fortification buildings (in Bejan near Deva, soldiers of the *vexillatio Legio XIII Gemina Antoniniana* were the labour force). In other Roman provinces, convicts sometimes were employed in quarries, but there is no information up to now about such kind of work in Dacia. Slave work in quarries neither can be evidenced though it is probable. However, the organisation of work in the studied period tended to give up this kind of employment, so we can suppose that most of the quarry workers were employed under work contract.

The region is also very rich in natural salt layers. Salt had many applications and was precious goods. Because of its high price, salt extraction played a major role in the economy. It was most precious also because outside



Fig. 12. Salt mine gallery in Potaissa

Transylvania, there were practically no other salt layers in the surrounding regions. After the conquest, the Romans went on exploiting Dacian mines existing before, and probably also opened new mines. Salt was probably extracted in the surroundings of the present cities of Turda, Cojocna, Sic, Ocna Dejului, Ilișua, Tîrnava-Mare, Bistrița, Năsăud and Sînpaul Homorodului. *Salinae* (today's Ocna Mureș), *Potaissa* (Turda) and, certainly, Ocna Sibiului were among the most important exploitation sites. The importance of these salt centres was due to the possibilities of transport to the river harbour of *Apulum*, where the products were loaded on ships. Two basic methods of salt extraction have been established. The first is a traditional mine method, evidenced by different kinds of miners tools discovered in salt mines. The second consisted in drying saltmarshes. When salt layers were not deep, sometimes outcropping, the second method was preferred. This method led to dig trenches at the bottom of which the exploitation level of the lode could be found. There, salt blocks were pick-extracted from the walls or the bottom of the trenches. These open air salt mines usually were 15 to 30 m wide and 4 to 8 m deep. Mines generally were funnel-shaped and could reach a depth of 20 to 40 m. On intensive exploitation areas, such funnels could be found practically side by side. At Praid, there were four salt mines which shapes remind a amphitheatre. AT Ilișua, the mine was organised in the same way than a quarry. When the lodes were difficult



Fig. 13. Salt on a surface of a meadow in Potaissa

Fig. 14. Wooden tools from a salt mine in Valea Florilor near Napoca, after MAXIM 1971, 459, 461



to access, for example because they were irregularly overlapped into rocks, they were soaked with water supplied from a well of the surroundings. The salted water emerging from the earth was then directed through wooden channels to evaporation ponds. We also can suppose that in areas where naturally

salted water gushed out, the water was collected and boiled in tanks. The remaining inscriptions evidence salt mining concessions.

Agriculture was another important branch of the economy. Immigrants settling in Dacia brought in a series of cultivation tools and introduced new species of plants and farm animals. A new division of the *ager publicus* lands was introduced, with imperial possessions, legion territories (among which the *prata*), and colony areas. Like in other parts of the empire, a system of land renting was organised. In the studied period, it seems that the role of slaves in this branch of economy was very limited. In the Dacian province, there is at present no evidence of the existence of large land possessions like *latifundia*. We can suppose however that the local municipal aristocracy was interested in creating them. Some particularly magnificent *villae* could be an evidence of their existence. On the contrary, small family farms have been discovered, as well as about 50 much larger possessions of the *villa rustica* type.

The *villae* usually were built in a short distance from the main roads, military camps and cities. The most important number of them have been found along the imperial way *Tibiscum – Porolissum* and in the close neighbouring of cities like *Tibiscum*, *Sarmizegetusa*, *Apulum*, *Potaissa*, *Napoca* and *Porolissum*. They probably were occupied by immigrants

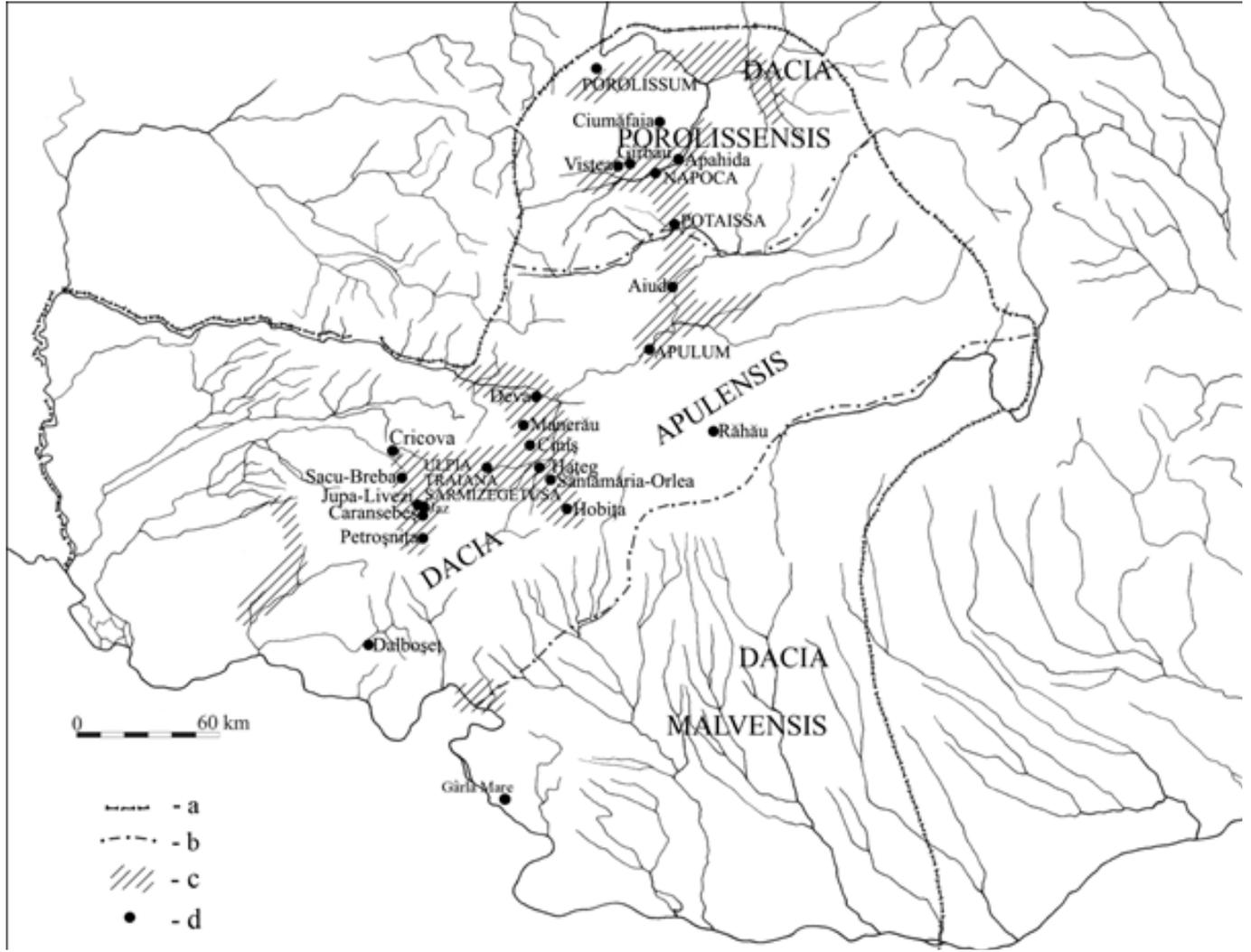


Fig. 15. Villae rusticae in Roman Dacia (based on MITROFAN 1974)

and veterans. Most of their workers were hired people. The importance of the crews depended on the kind of crops, work intensity and geographical conditions. Agriculture tools have been discovered during the archaeological searches: they are similar to the ones found in other Roman provinces. The surface of *villae rusticae* possessions is estimated to 50 to 150 ha, but they were sometimes larger, up to 250 ha. Thanks to burnt seeds, we know what were the main cultivated species: wheat, barley and millet. Remains of beans, lentils, peas, linseeds and hemp have been found too. Thanks to the discovery of vineyard knives and of a wine cellar in the surroundings of Potaissa, we also know that wine was cultivated. Horticulture and orchards were developed too, and there probably existed farms specialised in these productions.

In the mountains, extensive culture and stock farming (of sheep and goats) probably were dominant, and in the valleys, cultures depended on the needs and the ground fertility. Contrarily to the highlands, stock farming in the valleys was dominated by cattle (27% to 85% of discovered bones). Imported farm animals often were crossed with local, more primitive species. The Daces continued growing them afterwards. Apart from the mentioned species, there were also pigs, horses, mules, donkeys and different birds and dogs. Most of the animals were taken in the fields for long grazing periods. Zoological analyses allowed to establish the age of animals when they were killed, the species, which the farmers preferred, and the breeding operations they achieved on animals.

Another very important branch of the economy was the craft production. It is attested by inscriptions about craftsmen and their associations, seals on the pottery products, remains of workshops and pottery ovens, different tools and a very large collection of products of all kind. There existed small family workshops as well as large civilian or military production

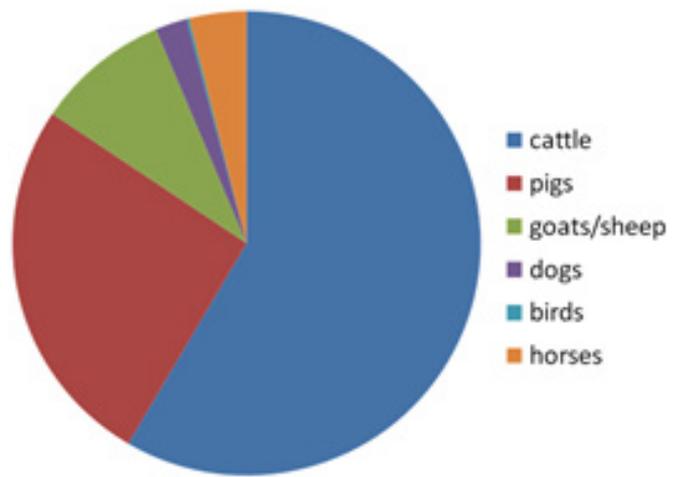


Fig. 15. Finds of animal bones at Ulpia Traiana Sarmizegetusa (amphitheater)

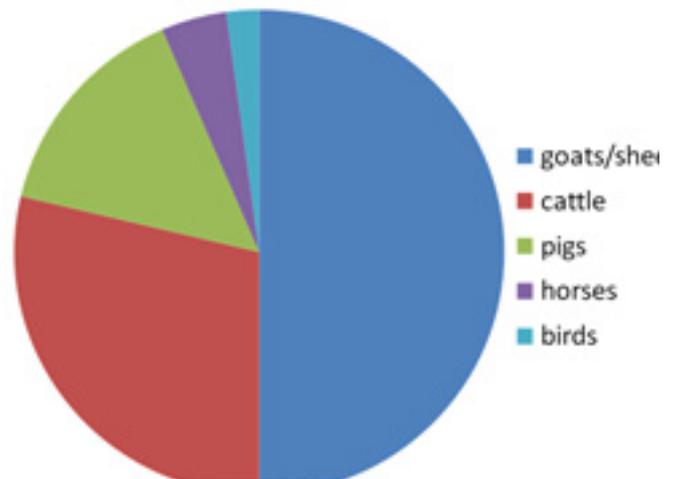


Fig. 16. Finds of animal bones in Porolissum (custom office in mountains)

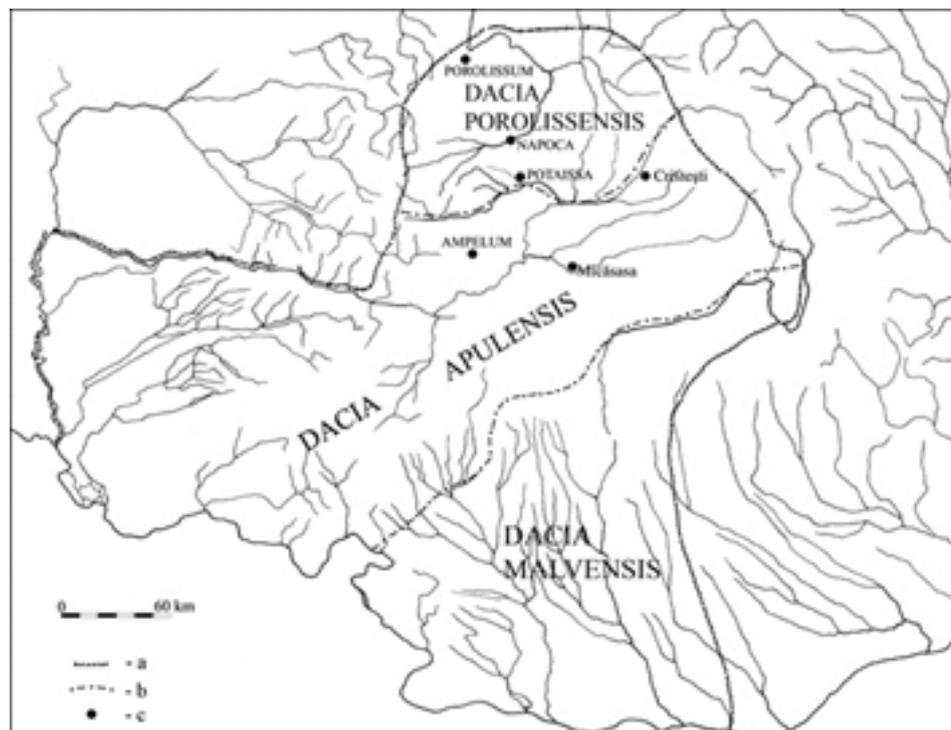


Fig. 17. Pottery centers in Upper Dacia

units. The most evidenced branches of craft are pottery, brick and stone works, ironworks, jewellery, glass pearl production, and bone and horn



Fig. 18. Fragment local made terra sigillata



Fig. 19. Roman road network in Dacia, © Cristian Găzdac

products. But there were much more crafts which existence is hardly attested by a few remaining information. Continuation of former traditions among the local population have been observed, as well as an introduction by immigrants of new methods, tools and patterns from other regions of the empire. In pottery, this is particularly visible in the production of *terra sigillata* items which very often are imitations of Gaul or neighbouring provinces products, and also in the production of local oil lamps which are very difficult to distinguish from the imported ones. In many craft branches, particularly in the Southern part of Dacia, patterns were imitated on the ones of other neighbouring Danube provinces. But in many other branches, like for example grave stone decoration, a local, original style was created and allows to identify items among others even from the same province. Despite the very unequal state of researches about the distribution of products, it has been possible to establish that part of the craftsmen produced for a local and limited market

while others supplied large markets extended to the whole province, or even sold most of their products abroad (e.g. glass pearls and *terra sigillata* pottery).

As one of the many positive consequences of the Roman conquest, Dacia was linked by transports to other parts of the empire. Immediately after the conquest, the Romans built there a whole roads network, bridges and river harbours which made easier the troop transports to the more threatened border regions and the military supplies to the armies quartered there.

Roads linked together the military camps but also the new

cities and extraction sites.

River transport was one of the most important. Thanks to the country's numerous rivers, many spots in Dacia were linked with the Danube, and therefore, with enormous territories of the whole empire. The Danube route bound the Western provinces with the banks of the Adriatic Sea, the Balkans and the Black Sea. The river routes also bound the analysed territories with sea harbours like *Aquileia*, and

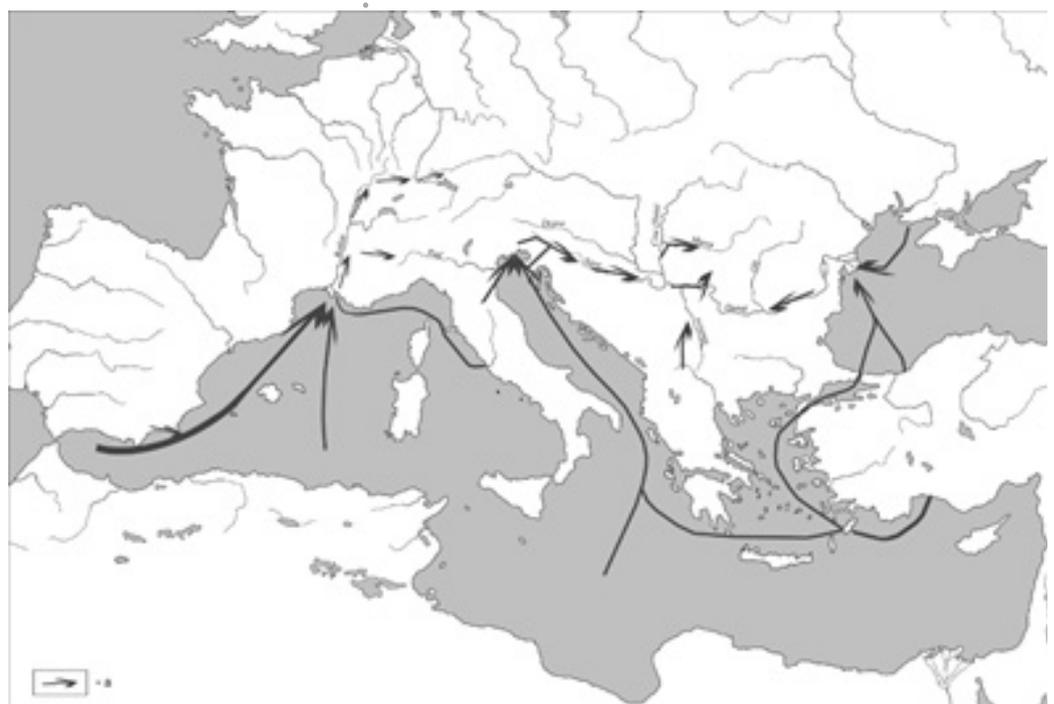


Fig. 20. The most important water ways

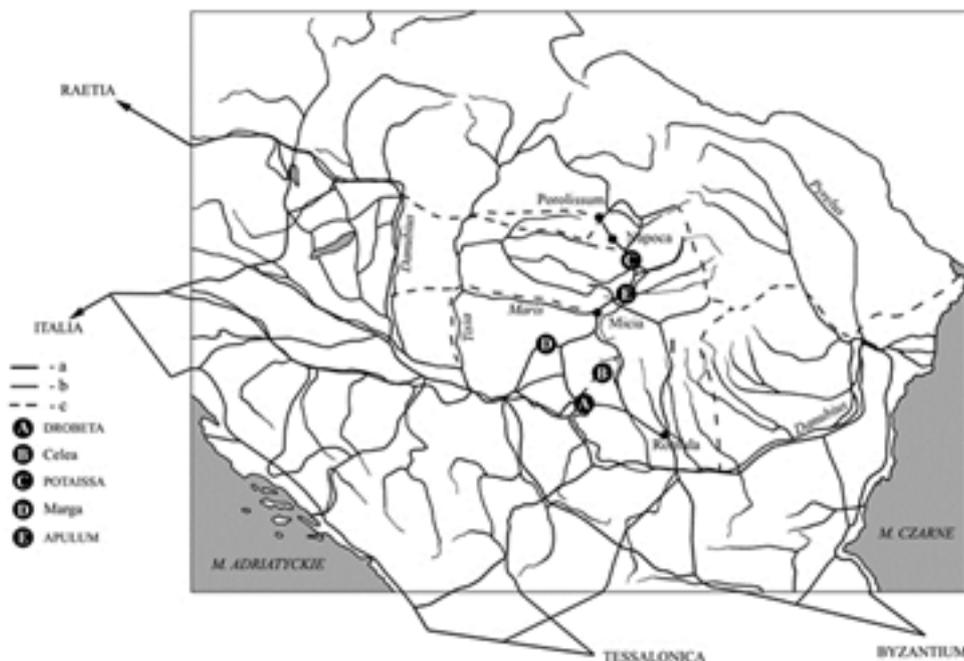


Fig. 21. Dacia within the Roman Empire road network

then with Italy in the West, and the Peninsula of Anatolia in the East. Through the Neckar River, the route also linked the Danube and the Rhine, and products from Gaul and Germany could easily be transported to Dacia. Another route led to the centre of the Balkan Peninsula along the Morava and Wader rivers. This route linked the Danube regions with the Aegean Sea. Another important river route led to the North East through the Tisza River.

Land transports were also very important. The main routes were situated in the South, on the Danube, where was the crossroad with the imperial way leading through many provinces. After the conquest, this route was prolonged to the Northern borders of the province and linked the main cities of Dacia. A dense side roads network linked together the border fortifications, the main mining sites and hundreds of little localities. The main road transport centres were the cities of *Apulum* and *Napoca*, situated at the crossing of many roads.

The province's road network was crucial for the army, but also for the economy, as it facilitated supplies, trade and population movements, among which the arrival of new immigrants on conquered territories. Land routes also led abroad to the neighbouring tribes and made it possible to trade with them. The road builders took into account the infrastructure stability, travel comfort and security, but also the facility of access to fresh water. Like in other provinces, inns were built every distance along the roads. Remaining milestone inscriptions show that road repairs were achieved at large scale. Different kinds of chariots and animals were used for transports, but walking was certainly very frequent too. Because of the hard climate of the province, we can suppose that transports also often depended on the weather conditions. In the winter, mountain routes could be close because of the snow, and during the thaw, river transports could be stopped. However, the enormous number of imported products show that the Ancients living in remote parts of the empire were able to cope with these difficulties.

Trade was another crucial branch of the economy. There was a local trade within the province or with neighbouring spots, but there was a far-distance trade too. Inner trade was mainly concerned with the distribution of locally produced items, like for instance the local *sigillata*. Far-distance trade consisted in imports to the provinces of products from other parts of the empire or sometimes from even farther countries, or goods exports from the analysed province. Many goods were imported to Dacia: *terra sigillata* pottery, amphorae with wine, fish sauces, olive oil, olives and other fruit. Slaves were also imported in a small scale. Some luxury products were probably

imported too. There was a trade of weapons and clothes. The exports consisted in raw materials among which iron and precious ores, salt, jewellery and certainly farm products, wood and wooden items, stone, wild and farm animals, furs and leather. In the province, the main sales markets were situated in military camps and cities. Tradesmen were



Fig. 22. Fragment of a pot from the workshop of Micăsasa (stamp ornament)

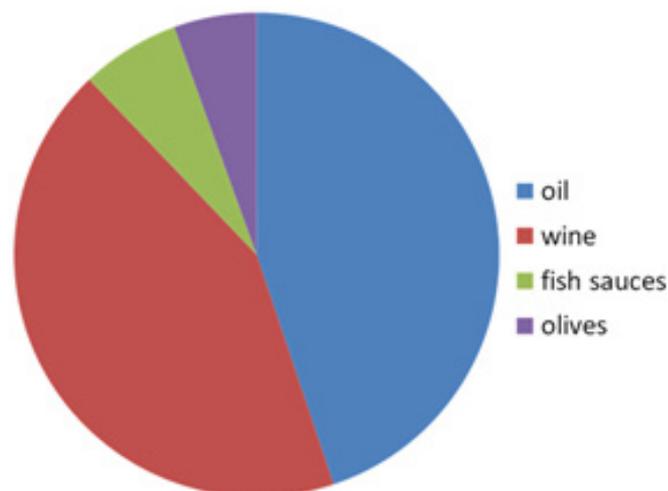


Fig. 23. Imports in amphorae

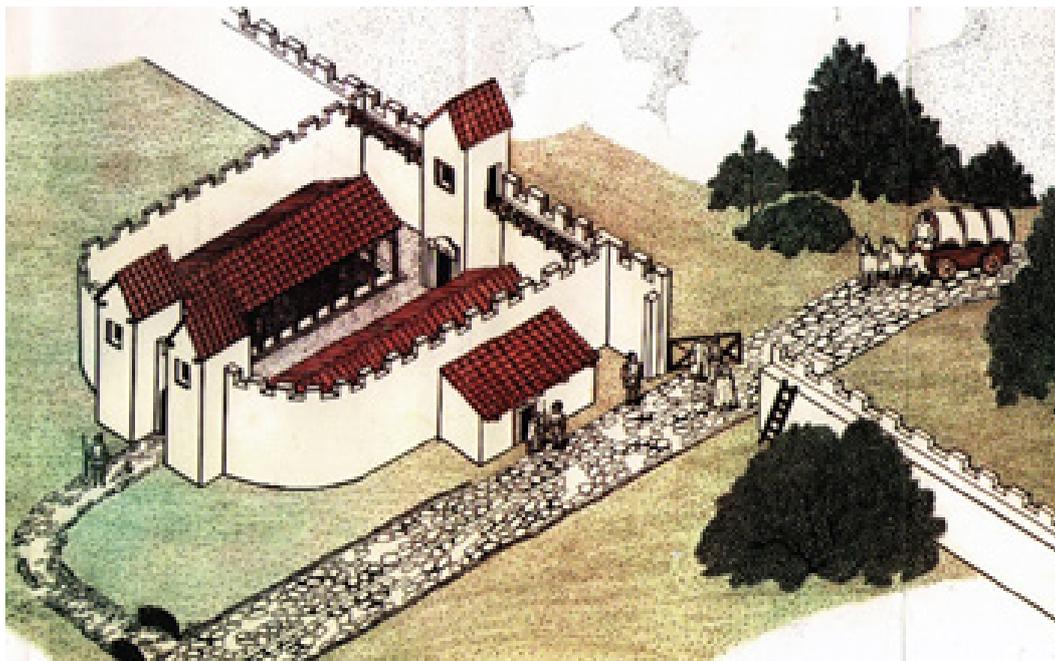


Fig. 24. The reconstitution of the custom office (*statio portorii*) at Porolissum (Moigrad), after GUDEA 1996

small retailers or important wholesalers, or their trades representatives. Their activities were also concerned with the work of customs agents. There were customs offices on the border of the empire, in *Porolissum*, but also in the largest cities. As other trade spots, there were also *tabernae* and regularly organised trade fairs where people came to sell their products. There probably existed an itinerant trade too.

The army played a major role in the economy of the province. It provided the empire with enormous riches, thousands of slaves, but above all permitted the Romans a long-term exploitation of the conquered territories. It defended the state interests guarding the borders and frontier posts, and watching the precious metal mines. The army probably also provided the mines with expert managing staffs. One of its main economic activities was building. An important part of the roads and bridges, especially over the Danube, were built by the army. The army produced enormous amounts of building materials and then used them to erect their fortifications and camps. It also took part in forest and quarry exploitation. Civilian settlements used to install in the surroundings of military camps and supply them services. The soldiers spent most of their salaries in the local inns, shops and craft workshops, and so contributed in the introduction of money into the economic market of the province. As another aspect of the military presence, veteran soldiers eventually left the army and continued a local economic activity. Taking into account the fact that most of the *villae rusticae* were situated near army camps, we can suppose that these camps were important outlet markets for the local food production. Discovered animal bones also show that army camps and their surroundings had an intensive stock-growing activity. Production workshops were also discovered within military camps. Part of their production, as it is attested for the building ceramics, was sold on civilian markets. Farms which belonged to soldiers supplied the military camps with food, but also the soldiers' families themselves. The overproduction was probably sold as plain revenue for the producers. However, it seems that

the army was rather a client and a buyer than a seller of goods and services.

Another economic aspect presented in this work are different activities of social significance that were financed by individuals or associations. It consisted for example in public building maintenance, the purchase of a municipal balance or supplies of olive oil to the public baths. These activities attest the emergence of local groups of rich persons who wanted to distinguish themselves and occupy a high position on the social scale.

As a conclusion, archaeological sources show us how the economy of the Roman province of Upper Dacia was highly developed in the studied period, and how it had important contacts with the rest of the empire. On the other hand, they also show that the province had many individual economic particularities.

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