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Ptolemy's coordinates and antique measurement points

**The application of mathematical geography in the region
between the Seine, Rhône, and Elbe rivers.**

Version 0.9.8.eng

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Introduction

This work presents a method for calculating ancient coordinates, known as Ptolemaic coordinates after the Alexandrian scholar Ptolemy. The starting point for the calculation is the value of the Hellenistic great Ptolemaic foot, which is 356,838624 mm per foot. Based on this, the distance between two degrees of latitude in the coordinate system is calculated as $600 \cdot 6,3 \cdot 63 =$ approximately 84,97755 kilometers. The circumference of the Earth used is obtained by multiplying this value by 360. The calculation assumes that the ancient coordinates do not define a point on the Earth's surface. The ancient coordinates are points from which the measurement points on the Earth's surface must first be calculated. This resolves the problem of the apparent inaccuracy of the Ptolemaic coordinates, which has been noted by all modern authors. The coordinates can be placed at the location intended for them in antiquity.

Of course, the length of the great Ptolemaic foot was not measured to the nearest millionth of a millimeter in ancient times. The measurement must have been derived from larger distances. Using the calculation method $600, 6,3 / 10 \cdot 11$, the measurement can be converted to the Roman mile with a value of 1,483734998592 km. The distances between coordinates and measurement points are not arbitrary but occur only at specific intervals.

The fact that Ptolemy was still familiar with the ancient calculation method cannot be inferred from the explanations accompanying the coordinate descriptions. His explanatory texts are often of a technical nature. The coordinate system, on the other hand, contains numerological elements, as the coordinate system itself is based on the numbers 600, 6,3, and 63. Divisions are possible, for example, using the numbers 7 and 3. Mathematics and numerology intertwine within the coordinate system.

The earliest literary mention of Ptolemy and his geographical work is found in Ammianus Marcellinus's *Res Gestae*, from the second half of the 4th century CE. He cites the geographer Ptolemy as an authority for precise measurements of distances. Ammianus Marcellinus must also have had access to maps based on Ptolemy's coordinate system, for he mentions in

Sarmatia the far-northern location of two altars, roughly at the level of river mouths in the Baltic region, dedicated to Alexander the Great and the Emperor¹ .

Ammianus Marcellinus regards the geographical location of the altars as absolute, which shows that he was no longer familiar with the ancient method of using the coordinate system. The latest possible date by which the ancient method of using the coordinates must still have been known is the second or third decade of the 2nd century CE. New entries of coordinates can still be found for this period. This is followed by a period of 250 years during which the understanding of the coordinate system must have changed, the ancient method of use was discontinued, and it was fundamentally revised.

In antiquity, the coordinates for the altars served as two axes from which distances to measurement points were measured. In Germania, there are coordinates comparable in function to these, with the **Nauaision coordinate** and the **Altar of the Flavians** serving as axes; these were needed for the depiction of the Germanic campaigns and the campaigns of the Flavian emperors in the Neckar region. The far northern location of the altars of Alexander and the Emperor stems from the great distances that Alexander the Great covered with his army from Macedonia to India and that the Emperor—presumably Caesar—covered.

The new interpretation of the ancient coordinates in this work also encompasses the textual corpus. RENATE BURRI is correct in noting that the manuscript tradition represents an extremely complex and as yet poorly understood subject² . Limiting the analysis to two manuscripts and to the geographical area of Gallia Belgica and western Germania constitutes a selection that makes it possible to identify constitutive features characteristic of this region, but also, where possible, beyond it.

Overall, the quality of the handwritten records of place names varies greatly, especially when one considers that changes occur in every language and that the presence of different spoken languages must be expected in the area under study. It appears that, in addition to Gallic and Germanic language forms, a variety of Greek must also be expected to have been a living language in the study area to a significant extent, and that there were fluid transitions between these languages. Latin is also present. The presence of Punic or, more generally, North African languages must also be taken into account. However, due to a lack of knowledge about the Punic language itself, the connection can only be described in rudimentary terms. In addition, other linguistic elements appear that cannot be classified.

When dealing with the transmission of toponyms, it is valuable to identify frequently occurring name components in order to gain insights beyond the individual toponym. This makes it possible to distinguish copyists' errors from structural linguistic features. An example of the certainty that can be gained when dealing with the transmitted texts is the four-fold occurrence of the shift from Greek π to Greek ϕ , which, due to its frequency, does not constitute a copyist's error but rather attests to the linguistic development of Greek in the geographical area under investigation.

¹ AMMIANUS MARCELLINUS, *Das römische Weltreich vor dem Untergang*, translated into German by Otto Veh, Amsterdam 1997:22,8,40. The list of coordinates mentions only "Emperor."

² BURRI, RENATE, *Die Geographie des Ptolemaios im Spiegel der griechischen Handschriften*, Berlin and Boston 2013: 88.

Part VI of this work compiles linguistic features that stand out during the analysis of the textual material and facilitate the understanding of individual toponyms and existing connections. The locative prefix, with its approximate meaning *where ... is located*, occupies a prominent position. It is present in several languages and had already ceased to serve its function of spatial orientation by the time of the Roman presence in Gallia Belgica and Germania. The Latin *ubi* still refers to forms of the locative prefix.

Overall, the linguistic context, the toponyms, and the basic mathematical features of the coordinate system point to a time of origin for the ancient coordinates that certainly dates back to the beginning of the 1st century BCE.

For the coordinate designations, I use the text corpus from Codex Vaticanus Graecus 177 and Codex Vaticanus Graecus 191, retrieved from the Vatican's digital library³, as well as the German translation by STÜCKELBERGER / GRASSHOFF⁴.

To calculate the distances between coordinates in the ancient coordinate system, I use the calculation method of the Polish-American geodesist Thaddeus Vincenty, which accounts for the Earth's oblateness⁵. The Earth's radius to be used for the ancient coordinates is derived from the construction of the coordinate system shown above, ranging from 4,868 to 4,869 kilometers. Once the distances between the ancient coordinates have been determined, they are projected into WGS 84 with identical distances. In this way, it is possible to convert the ancient coordinates into WGS 84 coordinates.

This work includes the following datasets:

Ancient coordinates converted to WGS 84

The file contains the longitude and latitude values of approximately 210 ancient coordinates for WGS 84, EPSG 4326.

Measurement points for the ancient coordinates, in WGS 84

The file contains the longitude and latitude values of the calculated measurement points in WGS 84, EPSG 4326. Approximately 350 data records.

Linkages between the ancient coordinates and the corresponding measurement points

The file contains data on the links ("mappings") between coordinates and measurement points, including the respective distance interval. Approximately 1.650 data records.

Since ancient coordinates represent not only geography but also historiography, a region-based presentation faces particular challenges. This challenge is further compounded by the

³ https://digi.vatlib.it/view/MSS_Vat.gr.177; https://digi.vatlib.it/view/MSS_Vat.gr.191

⁴ STÜCKELBERGER, ALFRED and GRASSHOFF, GERD. Klaudios Ptolemaios, Handbuch der Geographie, two volumes, 2nd edition, Basel 2017.

⁵ For the calculation method, see the formulae in the appendix.

fact that Ptolemy's regional divisions can only be reconstructed with considerable difficulty today. The study area is therefore divided into 16 regions that correspond to geographical areas existing today.

The data contained in the coordinates as measurement points, along with depictions of Roman military campaigns, is presented in a separate context outside the regional representation. The rivers Seine, Saône, Doubs, and Rhône are also presented in context. Fundamentally, the separation of the presentation into regions and cross-regional features remains a challenge that requires further work.

Part I Coordinates, distance intervals and measurement points

Coordinates Today and in Antiquity

What are coordinates for? There are simple ways to get from one point on the Earth's surface to another and to determine the distance and travel time in advance. A route planner on a smartphone displays the route and the estimated travel time. For trips by train, ship, or plane, departure and arrival times are readily available. What is less well known, however, is the ability to mathematically calculate the shortest distance between two points by specifying their coordinates in degrees and minutes. For example, the distance between the city halls of London, England, and Tokyo, Japan, is approximately 9.553,5 kilometers when the great circle distance is calculated using the Haversine formula—in this case, by an AI.

Smartphones, train and flight schedules, and AI did not exist 2.000 years ago, but coordinates did exist, and with their help and the application of mathematics, distances could be calculated theoretically. We have no information from antiquity regarding the application of mathematical knowledge for this purpose. However, it is also possible that information was preserved in manuscripts but has not been included in analyses over the past 700 years because the scientific understanding of Roman antiquity was no longer compatible with the natural-scientific understanding of science that has developed since the European modern era.

This work will demonstrate that in geography, the significance of coordinates in antiquity - of which between 6.500 and 10.500 have been preserved, depending on the method of counting - fundamentally differs from that of modern coordinates. Modern coordinates describe a point on the Earth's surface. The ancient coordinates themselves do not specify the location of a point on the Earth's surface, but they do make it possible to calculate points on the Earth's surface based on them. As will be seen, the calculation is performed using an interval system that must be referred to as the Pythagorean interval system.

This paper does not provide a comprehensive examination of the scientific understanding of the late Roman Republic and early Roman Empire, but focuses only on the few points necessary for a basic understanding of ancient coordinates. To this end, it is important to demonstrate the ability of the ancient world to calculate distances based on the few sources available today.

The mathematician Heron of Alexandria is known to have summarized a method for the astronomical calculation of the distance between the cities of Alexandria in Egypt and Rome, based on the observation of the same lunar eclipse at both locations. Heron apparently also presents the result of the calculation as part of a great circle.⁶ For the great circle, the circumference of the Earth must always be specified for the calculation. Heron of Alexandria,

⁶ SIDOLI, NATHAN, Heron's Dioptra 35 and Annalemma Methods: An Astronomical Determination of the Distance between Two Cities, in: CENTAURUS 2005, Vol. 47, pp. 236–258.

who lived and worked in the first century AD, cites Eratosthenes' figure of 252.000 stadia for the circumference of the Earth. Ptolemy later gives 180.000 stadia, a value for the Earth's circumference that had already been corrected by Eratosthenes.⁷

Ptolemy, author of the Geography, provides guidance on measuring distances. He describes a method of calculation in which points lie on meridians and parallels (longitude and latitude) and thus represent coordinate points. The distance between these is calculated as a segment of a great circle⁸.

An often overlooked benefit of coordinates lies in the easy availability of distance information. With 10.500 measurement points, this results in over 55 million individual distance values between the points. This volume of information is unmanageable; adding new data or removing data that is no longer needed is simply not feasible under any circumstances. Specifying only a single datum for each measurement point minimizes the effort and ensures that the data can be managed and used as needed. This argument remains valid even when working with only a small portion of the data. The effort involved in working with coordinates and calculating distances as needed is always much less than storing pre-calculated distances between points.

Herodotus provides an indication in the Histories that longitudes were used in the 6th century BCE. He writes of the sources of the Nile River, which he assumes are on the same longitude as the sources of the Ister River (the Danube). The fact that his assumption is incorrect is irrelevant in our context. What is crucial is that Herodotus offers no further explanation of the technical term, leading to the conclusion that his readers, for whom he wrote, were already familiar with the concept; otherwise, he would have included some explanation.

Ancient coordinates do not describe a physical point on the Earth's surface

The value required for calculations involving coordinates is that of the Earth's circumference or, derived from it, the Earth's radius. In the 1920s, the distance between one degree and the next at the equator was 111,30657 km⁹ (for the circumference of the Earth, therefore, $\times 360 = 40.070,3652$ kilometers); today, it is given as 111,31936 km (40.074,9696 kilometers), with hardly any change.

The situation was different in antiquity. Several figures for the circumference of the Earth in stadia have been handed down: 180.000 and 252.000 stadia, as well as 240.000 and other stadia values for the circumference of the Earth. Since there were different stadium measurements and the length of the stadiums used is unknown, it is not possible to convert

⁷ STÜCKELBERGER, ALFRED and GRASSHOFF, GERD. Ptolemaios Handbuch der Geographie, Bd. 1, Einleitung und Buch 1-4, 2. Auflage Basel 2017: 69.

⁸ Information based on the German translation from the Greek in STÜCKELBERGER / GRASSHOFF 2017 1: 63.

⁹ PAULYS REALENCYCLOPÄDIE DER CLASSISCHEN ALTERTUMSWISSENSCHAFT, Hrsg. von Kroll, Wilhelm, und Mittelhaus, Karl, Zweite Reihe, Sechster Halbband, Artikel Stadion (Metrologie), Stuttgart 1929: 1935.

these figures into modern measurements. It is also unknown whether different or the same stadium measurement was used.

In an experiment, therefore, a comparison is made between modern distances and ancient distances, in which the starting and ending points in antiquity and today are identical. The modern cities of Cologne and Mainz correspond to the ancient locations designated in the coordinates as **Agrippineensei** and **Mokongiakon**. The distance between the ancient locations must—in the order of magnitude—correspond to modern distances.

If the modern distance and the ancient distance are identical—so the thesis goes—then, using the Earth's radius as an intermediate step, the **ancient circumference of the Earth** and thus the **length of the stadium** can be determined.

To broaden the scope of the results, the analysis is conducted not only for the distance between the cities **of Cologne** and **Mainz** but for the distance between 62 coordinates and their modern counterparts—that is, for more than 3.700 distances among the 62 coordinates.

Since research has shown that short distances between Ptolemaic coordinates exhibit significant deviations, long distances are preferred; for example, from the city **of Tunis** in Tunisia to **the city of Mainz in Germany**, which should correspond to the route from ancient **Karchedon** to **Mokongiakon**¹⁰.

Once the results are available, an average distance of 539 kilometers emerges, and in the best-case scenario, an average deviation between the ancient and modern distances of just over 61 kilometers. The deviation is too high to reliably derive a value for a stadium from it. Since the results also fluctuate with a slight reduction in the group of 62 coordinates, an approximate value of about 168 to 172 meters remains as the length for a stadium.

This would not initially be a standard stadium measurement. The stadium of the Attic-Roman foot, based on 8 ½ parts of the Roman mile, is 174 meters; the stadium of the Oscan-Italian foot is one-ninth of the Roman mile, or about 164 meters.¹¹ The measurement result lies between these two.

Since the deviation cannot be reduced to less than 61 kilometers with any circumference of the Earth and no scatter is discernible, it must be assumed that a spatial deviation between the ancient coordinate and the modern location correctly describes the result. The hypothesis that the modern distance between the locations is equal to the ancient distance between the coordinates is therefore incorrect. This is not a matter of the measurement method or units, as the distance is independent of the units in which it is expressed. The reason lies in the fact that while the ancient coordinates Agrippineensei and Mokongiakon refer by name to ancient Cologne and ancient Mainz, the location of their coordinates on the Earth's surface already

¹⁰ On deviations over short distances and less pronounced deviations over long distances, see RASCH, GERHARD, *Antike geographische Namen nördlich der Alpen*, ed. by Zimmer, Stefan, Berlin and New York 2005: 274.

SHCHEGLOV, DMITRY A., "The configuration of the Pontus Euxinus in Ptolemy's Geography," *Hist. Geo Space. Sci.*, 11, 31–51: 41. <https://doi.org/10.5194/hgss-11-31-2020>, 2020.

¹¹ PAULIS REALENCYCLOPEDIA OF CLASSICAL ANTIQUITY, ed. by WISSOWA, GEORG, Series 2, Vol. 6, Stuttgart 1929:1933,1934.

differed from both cities in antiquity. The conclusion is that the ancient coordinate data did not indicate the location of places even in antiquity, but rather indicated the location of something else.

Since the modern equivalents of a number of ancient place names are established with a high degree of certainty, the question arises as to why the ancient coordinates do not designate the place itself, but consistently designate something else.

At this point, it must be emphasized once again that the discussion of the Earth's circumference in antiquity had substance. The Earth's circumference is needed to perform distance calculations within the coordinate system. The uncertainties demonstrate how fragile the basis for distance calculation is and the uncertainties with which it is fraught.

The size of the Earth's circumference according to Ptolemy, compared to Eratosthenes

The mathematician RUSSO has published a study on the Ptolemaic longitudes used along a west-east axis through the Mediterranean Sea¹². He concludes that along this axis, which corresponds to a line through the Mediterranean Sea, there are 1,428 times more Ptolemaic longitudes than in the modern coordinate system. If today's values are used for the distances between the Ptolemaic longitudes, the Mediterranean is thereby stretched 1,428 times from west to east.

The impression is that - and RUSSO argues this as well - the cause of this stretching lies in the reduction of the Earth's circumference by a factor of 1,4, from 252.000 stadia, according to Eratosthenes, to 180.000 stadia, as endorsed by Poseidonius. Since the smaller circumference of the Earth leads to a reduction in the distances between lines of longitude, it was necessary to use more lines of longitude to correctly represent the actual length.

FORSTNER¹³ has provided an overview of the adoption of the Ptolemaic coordinate system in European cartography from the 15th century onward. He shows that Ptolemy's representation of the Mediterranean Sea in longitude, from Gibraltar to Iskenderun, was overstretched by about 20 degrees and amounted to 62 degrees of longitude, whereas in a target model using modern values it would have to be 41,29 degrees. According to FORSTNER, Ptolemy's representation is thus 1,5 times the modern length. Ptolemy's overstretched representation was initially adopted into European cartography and only corrected over the course of several centuries.

¹² RUSSO, LUCIO, Ptolemy's Longitudes and Eratosthenes' Measurement of the Earth's Circumference, Mathematics and Mechanics of Complex Systems, Vol. 1, No. 1, 2013
[dx.doi.org/10.2140/memocs.2013.1.67](https://doi.org/10.2140/memocs.2013.1.67)

¹³ FORSTNER, GUSTAV, Längenfehler und Ausgangsmeridiane in alten Landkarten und Positionstabellen, Dissertation for the Degree of Doctor of Engineering. University of the German Armed Forces, Munich 2004.

RUSSO's mathematical analysis and the development of the representation of the Mediterranean axis in European cartography clearly demonstrate the use of a smaller circumference of the Earth by Ptolemy compared to Eratosthenes. This, however, also sufficiently answers an important question, namely whether Eratosthenes and Posidonius had determined the same circumference of the Earth through their observations. For it is conceivable—and this has indeed been argued—that Ptolemy specified 500 stadia and Hipparchus 700 for the Eratosthenic stadium, yet that, due to differing stadium lengths, the same circumference of the Earth underlies the result. RUSSO also follows this line of reasoning by calculating a length of 0,2222 km for the Ptolemaic stadium and, for the Eratosthenic one, adopting HULTSCH's figure of 0,1575 km. In doing so, he compensates for the difference in the number of stadia.

Given the observed elongation of the Mediterranean Sea in Ptolemy's account, the more conclusive finding remains that the Ptolemaic circumference of the Earth was smaller than that of Eratosthenes, with the result that the length of the Ptolemaic stadium must also have been smaller than the calculated 0,2222 km. The exact lengths of the Eratosthenic and Ptolemaic stadia still need to be calculated.

Projection of the coordinates of the smaller Earth onto the larger WGS 84 ellipsoid

I assume that the distances represented in the ancient coordinate system could only have been measured on an actual existing Earth. The units of measurement in which the distance is expressed may vary, and they may have been calculated differently, but their measurement point could only have been the actual Earth. Since there is no smaller terrestrial body, the distances between the Ptolemaic coordinates of the smaller terrestrial body must therefore also be the distances on the actual terrestrial body. The ancient coordinates must thus be able to be placed on the actual existing terrestrial body.

For this purpose, the ancient coordinates are projected onto the larger WGS 84 ellipsoid using their distances from the smaller Earth. Based on the previous analysis, it is expected that the location of the coordinates will not correspond to the modern locations indicated by the coordinate designations.

As far as I can see, there is no question that Ptolemy's coordinates were calculated for a globe with a circumference of 180.000 stadia. He mentions the division of the Earth into 360 degrees and a degree of 500 stadia¹⁴. Compared to Eratosthenes' measurement of the Earth's circumference, we have a significantly smaller Earth with a circumference of approximately 30.240 kilometers to about 31.000 kilometers¹⁵.

¹⁴ STÜCKELBERGER / GRASSHOFF, Ptolemaios Handbuch der Geographie, Bd. 1, Einleitung und Buch 1-4, 2. Auflage Basel 2017: 69.

¹⁵ See above regarding the dimensions of the stadium used.

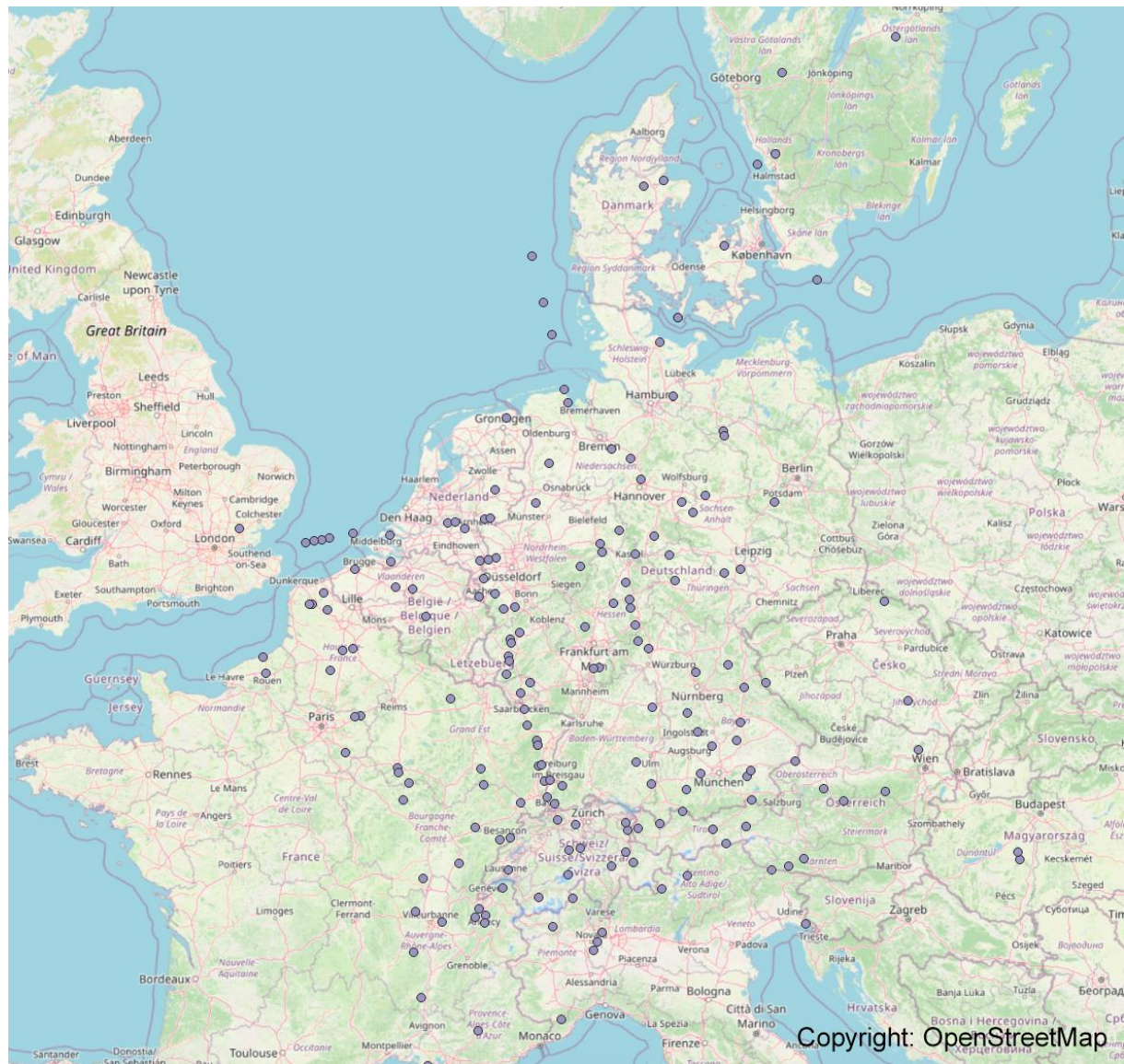
It is not possible to project Ptolemaic coordinates onto WGS 84 without taking into account that the distances between Ptolemaic coordinates are smaller than those between modern coordinates with the same designation. If this is not taken into account, the distances between the coordinates on the larger globe are increased by a factor of approximately 1,4. This would correspond to a procedure in which the proportions are subsequently enlarged and the distances stretched apart.

Nevertheless, a number of studies have chosen to project the Ptolemaic coordinates directly into the modern coordinate system. I will address the associated problems elsewhere.

For the projection of the shorter distances of the smaller globe onto a WGS 84 ellipsoid, I use the calculation method of the mathematician Thadeus Vincenty and an Earth radius of 4.868 kilometers, which has proven to be the most accurate in several comparative calculations conducted in the manner shown above. First, the 62 coordinates in WGS 84 are placed at the locations identified as incorrect in order to subsequently correct their positions.

The correction is performed by taking each coordinate and using the other 61 coordinates to determine its direction and calculate the distance to it. The calculation is performed for a sphere with a radius of 4.868 km using the Ptolemaic coordinates, and in parallel for a sphere with a radius of 6.378,13 km using the coordinates of the locations identified as incorrect. Since the distances from both measurements are not identical, the point on the surface of the WGS 84 ellipsoid where the difference in distance is smallest is now sought. This point is determined in grids of $\frac{1}{4}$ arcminute in WGS 84. The coordinate is then shifted to the point determined in this way, and the same procedure is followed for the other 61 coordinates. The procedure is then repeated until the position of no coordinate changes with a new bearing. This is followed by another pass in which the number of coordinates is gradually increased to 151, and their positions on the ellipsoid are determined for these using the same procedure.

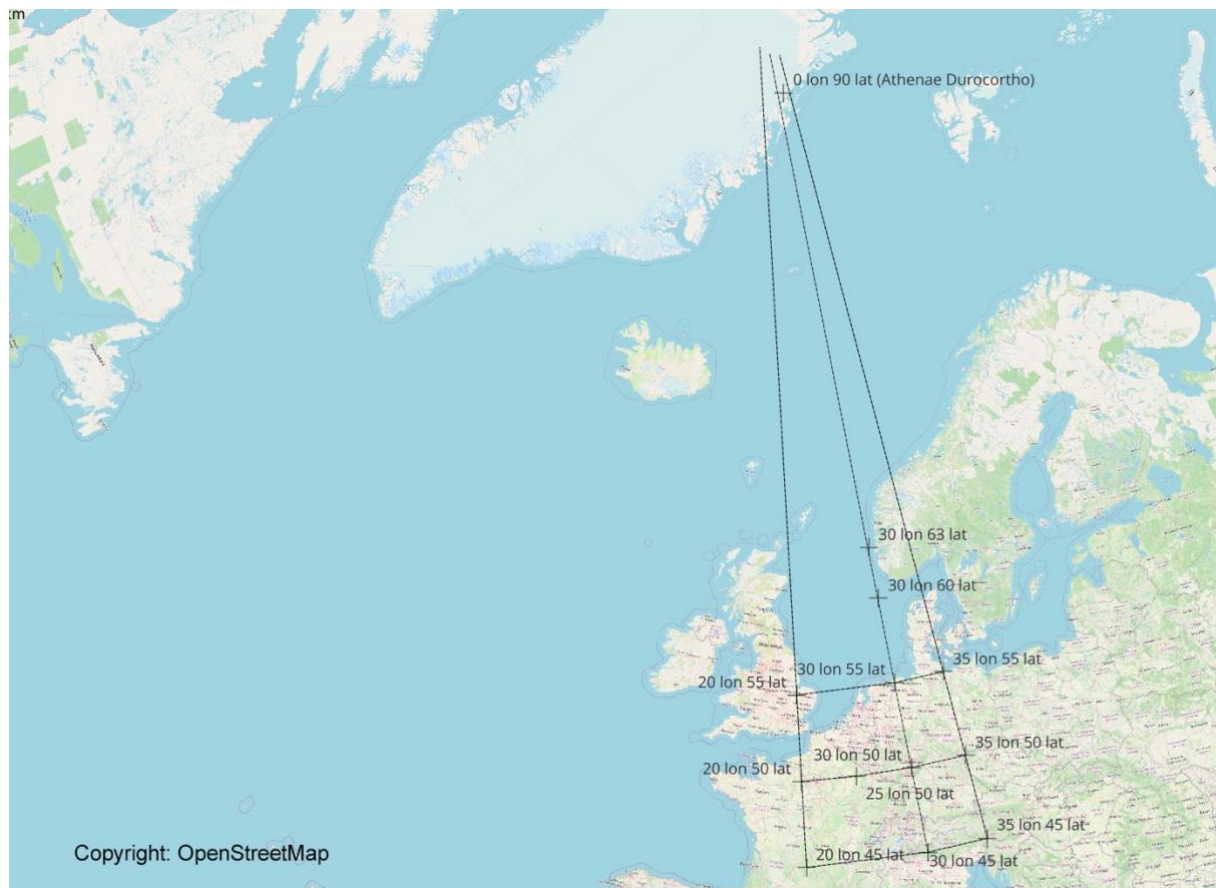
As a result, 151 coordinate points were projected from a smaller Earth model with a circumference of 30.591,918 kilometers onto a larger Earth model, the WGS 84 ellipsoid. The distances between the coordinates in WGS 84 are now the distances of the smaller Earth model.



Calculation of the ancient degree grid in WGS 84

Using the 151 placed coordinates, it is possible to reconstruct an impression of the originally used coordinate grid. To do this, the distance from the 151 coordinates to the coordinate 30° longitude / 50° latitude and to other coordinates is calculated using the same method.

The projection shows that, as expected, the ancient coordinate system is based on the smaller sphere. It is noteworthy that the point of 0° longitude and 90° north latitude (0° lon, 90° lat) determined by this method does not lie - as it does today - at the northern tip of the Earth's axis of rotation, but rather on the east coast of Greenland.



The extensions of the 20th, 30th, and 35th Ptolemaic degrees of longitude do not appear to meet at the point 0 lon 90 lat; the reason for this is not apparent. The alignment with northern Greenland is discernible despite the remaining discrepancy.

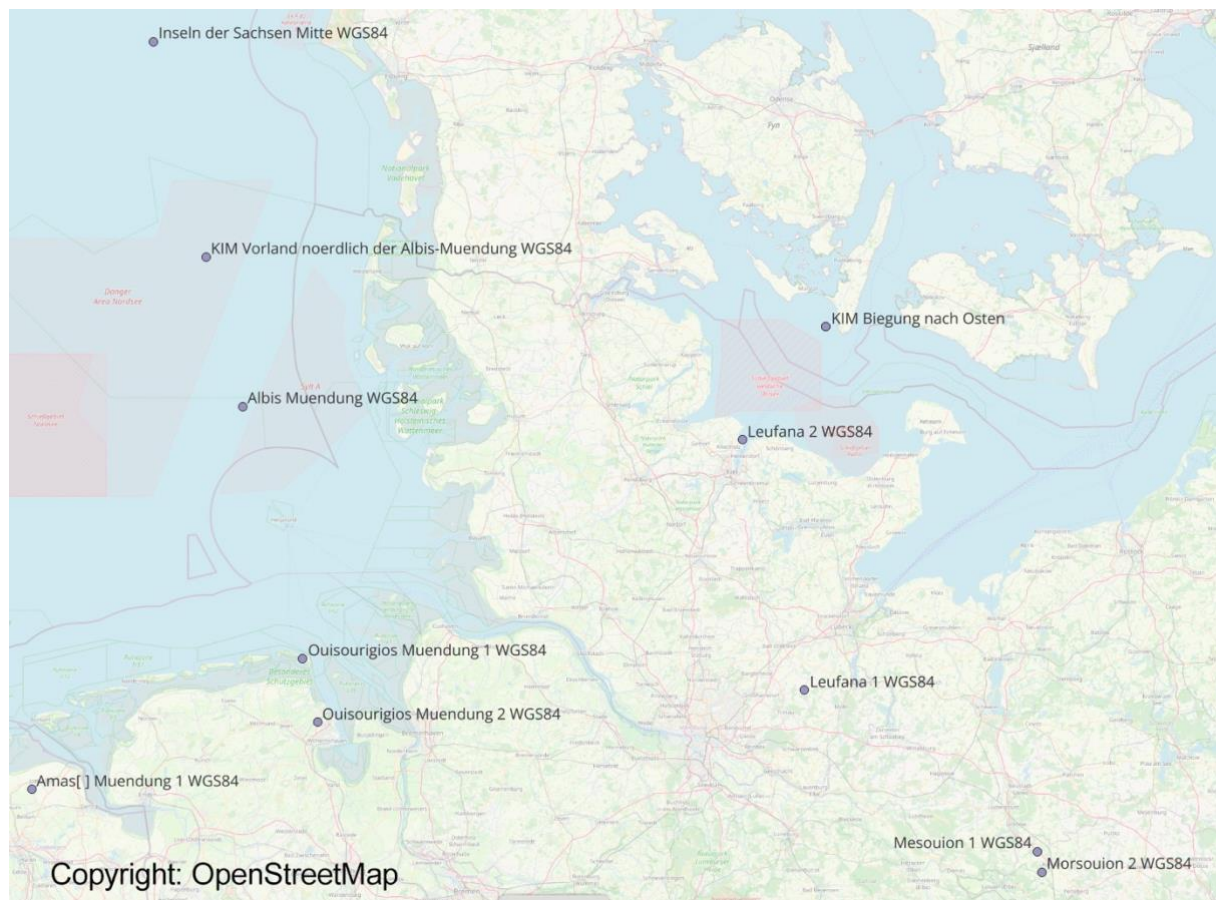
In addition to the 151 coordinates in the geographic space, I have projected further coordinates onto the WGS 84 ellipsoid using the method described, including the ancient coordinates of Byzantium and Massilia (see list of coordinates). Regarding both locations, the Greek geographer Strabo¹⁶ states at the beginning of the 1st century AD that, according to Hipparchus - who relies on the Massaliot Pytheas - the locations of Massilia and Byzantium lie approximately on the same parallel, i.e., at the same latitude. The information from Pytheas as transmitted by Hipparchus does not fit the coordinate system used today.

Measuring the distances from the coordinates of Massilia and Byzantium to the point 0° longitude, 90° latitude in the ancient coordinate system yields the following results:

Coordinate Byzantium – 0° longitude, 90° latitude	4.000,140 km
Coordinate Massilia – 0° longitude, 90° latitude	3.965,898 km

The deviation is so small that it can be assumed that Pytheas's data refers to a coordinate system with the same point 0 lon 90 lat, possibly the one thus reconstructed.

¹⁶ Strabons Geographika II,5,8, mit Übersetzung und Kommentar, hrsg. von RADT, STEFAN, Band 1, Göttingen 2002: 279.



Arrangement of ancient coordinates on lines in WGS 84

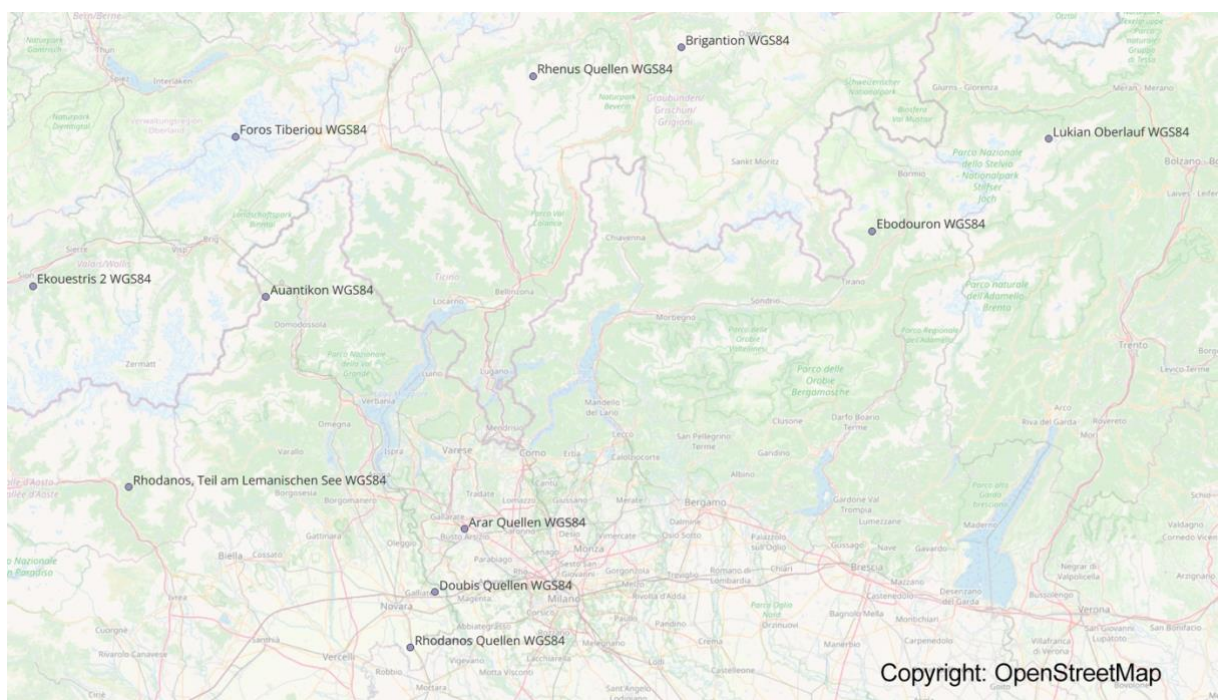
On the North Sea coast in what is now the German Bight, there are five coordinates in a straight line: to the south, the mouths of the Ouisourigios (the Weser River)¹⁷; then to the north, the mouth of the Albis River (the Elbe River); the foreland (or a headland) north of the Elbe estuary; and a reference to the center of the Saxon islands.

The placement in a straight line confirms the observation that the point on the sphere designated by the coordinate is not located on this line.

¹⁷ These and the following designations are based on Cod. Vat. Gr. 177 and Cod. Vat. Gr. 191



In the North Sea off the coast of Belgium, five coordinates lie on a line: Tionakron 1, Ition Akron 2, Gesoriakon 2, Tisoriakon 1, and the Tabouda estuary.



Near Milan, the three coordinates Arar Springs, Doubis Springs, and Rhodanos Springs lie on a line.

The examples cited demonstrate that the topographical features along the coast and at the sources of the rivers certainly do not represent the location of points on the Earth's surface or on the sphere. It is highly unlikely and, in fact, can be ruled out that in antiquity, prominent topographical features could have been aligned in a straight line with one another.

The thesis put forward by GRASSHOFF, MITTENHUBER, RINNER¹⁸ - that Ptolemy's work contains clusters of coordinates that were shifted together- is unsatisfactory, since here individual coordinates, not clusters, have been aligned in a straight line.

The reason is rather to be found in the fact that the point on the sphere designated by the coordinate must be sought elsewhere. In the following, I will demonstrate how the point is calculated based on the coordinates.

Distance intervals between coordinates and measurement points

This section deals with the distance intervals between coordinates and measurement points. This means that the distance between a coordinate and its associated measurement point cannot have just any value, but must always follow a specific numerical interval.

The way to identify these intervals is to determine the distance between coordinates and measurement points. Measurement points that have described the same point on the Earth's surface in both ancient and modern times are suitable for this purpose. These include river courses that still exist today, such as the Danube and the Saône, and places such as Brigantion (today Bregenz) and Mokongiakon (Mainz). The distances to such points are measured.

The results show that the interval system has an initial value of 13,4885 kilometers. The full value and multiples thereof, as well as one-twelfth of it in each case, form an interval value, for example $2 \frac{2}{12}$. This corresponds to the fact that 60 degrees in the coordinate system are divided only into twelfths, that is, into 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, and 55 arcminutes. As I said, the measurements show that distances cannot be arbitrary, but that the distances between coordinates and points on the sphere—I am referring here to the **measurement points**—are only possible as **intervals**.

I have illustrated the interval system. These are full intervals and multiples of the base value. In relation to the measurement points, half-intervals (2,5; 7,5, etc.) are also used, as well as intervals in tenths (0,1; 0,2, etc.). Using this method, the location of measurement points on the Earth's surface is calculated based on coordinates that are not themselves points on the Earth's surface. A measurement point exists when intervals of three or more coordinates coincide at a single point on the sphere. A small residual deviation of a few meters may occur.

There are two parallel reference values for interval sizes. The first interval size is based on the reference value of 1,34885 km, the short Roman mile (see below), which, when multiplied by 63, yields 84,97755 km—the distance from one degree of latitude to the next. The circumference of the Earth calculated using the short Roman mile is accordingly $360 \cdot 84,97755 \text{ km} = 30.591,918 \text{ km}$ or 180.000 stadia. Example: For an interval of $\frac{5}{60}$ or 0,8333 of 13,4885 km, the interval value is 1,12404166666666666666 km. A measurement point is located

¹⁸ GERD GRASSHOFF, FLORIAN MITTENHUBER, ELISABETH RINNER, "Of paths and places: the origin of Ptolemy's Geography," in: Archive for History of Exact Sciences (2017) 71:483–508. DOI 10.1007/s00407-017-0194-7

at this distance from the coordinate if at least two other coordinates are also linked to this point by an interval.

For this work, I use ten times the value of 1,34885 = 13,4885 km as the interval basis.

The second starting value for intervals is 0,1683 km. Multiplied by 700, this yields 117,81 km, the distance from one degree of latitude to the next. The circumference of the Earth is accordingly $360 * 117,81 \text{ km} = 42.411,6 \text{ km}$. The circumference of the Earth is that of 252.000 stadia, with a value of 168,3 meters per stadium and 700 stadia per degree of arc at the equator or as the distance between two degrees of latitude.

As a reference value for intervals, I use the hundredfold value $0,1683 = 16,83 \text{ km}$ as the interval basis in this work.

There are therefore two starting values for intervals used to calculate the distances between coordinates and measurement points.

Ratio of the interval measures to the Roman mile, to the stadium and foot measures, and to the Gallic league

The interval measurements are related to known units of length. The base value of 1,34885 km includes the Roman mile, which is obtained via the calculation $/10 * 11 = 1,483735 \text{ km}$.

Using the same calculation method—with an intermediate step—the Gallic league is derived from the base value of 168,3 meters. The calculation is $*12 /10 *11 = 2,22156 \text{ km}$. The long Gallic league is derived via $*12 /10 *12 = 2,42352 \text{ km}$ ¹⁹.

The short Gallic league, as a mathematical equivalent to the short Roman mile, is expressed as $0,1683 \text{ km} * 12 = 2,0196 \text{ km}$ in relation to the circumference of the Earth, 21.000 short Gallic leagues equal the circumference of the Earth of 42.411,6 km, which in turn corresponds to 252.000 stadia of 168,3 meters each. The Eratosthenic stadium and the short Gallic league are related as follows:

$$2,0196 \text{ km} / 12 = 0,1683 \text{ km}.$$

The Eratosthenic stadium therefore corresponds to one-twelfth of the short Gallic league.

The Greek distance interval 1,34885, which is related to the Roman mile at a ratio of 10:11, in turn includes the great Ptolemaic foot, an Egyptian unit of length from the Hellenistic period. According to Jüthner, the length of the great Ptolemaic foot is 356,4 to 357,2 mm. $1,34885 \text{ km} / 6.3 / 600$ yields the measurement of the great Ptolemaic foot as 356,838624 mm, which matches the expected value very closely.

¹⁹ On the great Gallic league, see DASSIÉ, JACQUES, La grande lieue gauloise. In: Gallia, vol. 56, 1999. pp. 285–311; <https://doi.org/10.3406/galia.1999.3011>, accessed June 2, 2025

6,3 and 63 prove to be values of great significance. Of the short Roman miles, 63 correspond to the distance between two degrees of latitude, which is 84,97755 km. The Oikoumene extends to the 63rd parallel north. The construction of the northern Oikoumene is thus, based on the Ptolemaic foot, $\ast 600 \ast 6.3 \ast 63 \ast 63$. The stadium of the Ptolemaic foot therefore has a value of 0,214103174 km.

We cannot rule out the possibility that the short Roman mile, measuring 1,34885 km, traces back to the seven-mile stadium documented for Ionia in modern-day Turkey²⁰, which has a ratio of 1:7 to the Roman mile. The seven-part-mile stadium is based on the Philetairic foot of the Hellenic Kingdom of Pergamon. The length of the seven-part-mile stadium, calculated from $1,34885 / 10 \times 11 = 1,483735 \text{ km} / 7 = 0,211962143 \text{ km}$. The Philetairic foot is calculated as $/ 600 = 353,270238 \text{ mm}$. Hultsch²¹ sets this at 350 to 353 mm, while Jüthner²² sets it at 353,6 mm.

This shows that 6,333333 must be used instead of 6.3 to get close to the values, i.e., $1,34885 / 6,333333 / 600$, which yields a value for the seven-mile stadium of 0,212976326 km and for the phyleteric foot of 354,960544 mm. Both values are higher than expected. The more precise value is that of the Ptolemaic foot, so this should be preferred.

Probably based on the depiction of the Oikoumene and only secondarily, a circumference of the Earth of 180.000 stadia was calculated, because the resulting stadium length of 0,1699551 km stands alone among the known or derivable stadium lengths. It is also impossible that the circumference of the Earth could have been calculated by observation to be 180.000 stadia with a stadium length of 0,1699551 km, since this value deviates too greatly from the correct measurement for the Earth's circumference.

The Greek distance interval and the coordinates based on it constitute a purely mathematically calculated system and not one derived from observation of nature. The mathematician Heath already considers this to be the most likely assumption regarding Pythagoras' coordinate system: ²³

“The most likely supposition is that Pythagoras's system was purely mathematical, or mathematico-aesthetic; that is, he attributed a spherical shape to the Earth (as to the universe) for the simple reason that the sphere is the most beautiful of solid figures.”

Regarding the ratio of the Roman mile to the Eratosthenic stadium, we have the statement by Pliny the Elder that, according to Eratosthenes, the circumference of the Earth was 252.000 stadia, which corresponds to 31.500 Roman miles ²⁴. However, this cannot refer to the Roman

²⁰HULTSCH : 568.

²¹ HULTSCH, FRIEDRICH, Greek and Roman Metrology, 2nd ed., Berlin 1882: 566 ff.

²² JÜTHNER, JULIUS, in Paulys Realencyclopädie der der Classischen Altertumswissenschaft, ed. by Kroll, Wilhelm, and Mittelhaus, Karl, Second Series, Sixth Half-Volume, entry Stadion (Metrology), Stuttgart 1929: 1946 ff.

²³ Heath, Thomas. A History of Greek Mathematics, Vol. 1, Oxford, 1921, p. 162

²⁴ C. Pliny the Elder, Natural History, Book 2, Cosmology. Ed. Roderich König, Munich / Zurich, 2nd ed. 1997: 205.

mile of 1,483,735 km, because using this value results in a much too large Earth with a circumference of 46,737,6525 km. Pliny the Elder can only have meant the short Roman mile, because using its value of 1,34885 km yields a circumference of $1,34885 \text{ km} \cdot 31.500 = 42.488,775 \text{ km}$, which is close to Eratosthenes's circumference of 42,411,6 km.

Accuracy of the measurement points at the intersection of the intervals

With the ancient coordinates given in degrees and the minute values limited to twelfths, only a very rough geographical location can be determined. One twelfth of 84,97755 km results in a grid of 7,0814625 km between two full degrees of latitude.

Using the interval, calculated based on the coordinates, a more precise location calculation is achieved. With one-twelfth of 13,4885 km, the smallest unit is 1,12404166 km. Since half-intervals were also used, calculations are also performed with $1/24 = 0,56202083 \text{ km}$.

Since these are intervals, the achievable accuracy must be assessed differently. A measurement point exists when, at a point within an interval—for example, the one-twelfth interval at a distance of 1,12404166 km from a coordinate x—at least two additional interval points lie at the other coordinates y and z.

The determined measurement points show that for deviations of up to about five meters, a measurement point generally exists; for deviations of up to about ten meters, it depends on how many interval points meet at the measurement point. The more interval points that lie at a measurement point, the more likely the deviation can be up to about ten meters.

Scatter does not appear to occur in this model, because either the intervals meet at the measurement point or there is no measurement point. Among the over 200 determined measurement points, there is thus no distribution of measurement points in the sense of a scatter of more precise and less precise measurement points.

Origin of the interval sizes

The use of 6,3 and twice 63 is likely based on ancient numerology, in which a specific meaning is associated with a number. The number 63 can be further broken down into 3×21 , and 21 into 3×7 . For the construction of the Oikoumene, its classification within numerology would have been indispensable. The Gallic circumference of 21.000 leagues also contains the number 21.

The number 21 also appears in the Sodales Augustales, established in 14 CE, the Roman priesthood dedicated to the cult of the Gens Julia in the person of the Roman Emperor

Augustus, who had been deified. At the outset, the priesthood consisted of 21 members, selected by lot from Rome's most distinguished families²⁵.

The Greek geographer Strabo, writing at the beginning of the 1st century AD, reports that measurements closer to his own time made the Earth appear smaller than the findings of Eratosthenes, who estimated the Earth's circumference to be 252.000 stadia. Since he also reports that Poseidonius endorsed the smaller value of 180.000 stadia for the Earth's circumference²⁶, his lifetime can be used to determine that the new stadium value was established in the first half of the first century B.C. Since this is based on a significantly smaller circumference of the Earth, it cannot have been derived from measurement. It is plausible that this refers to the model of the representation of the Oikoumene based on the Ptolemaic foot and the short Roman mile with $\frac{1}{6}$, $\frac{1}{63}$, $\frac{1}{63}$, which was described in this way.

The great Ptolemaic foot contained in the Greek distance interval attests to an Egyptian origin. According to Jüthner²⁷, this is a result of the transportation, coinage, and measurement policies of Ptolemy I in Egypt at the end of the 4th century / beginning of the 3rd century BCE. Ptolemy I's policy aimed to align Egyptian measures with Greek ones. The Philetairic foot is a unit of measurement from Pergamon in Ionia, in present-day Asia Minor. Philetairos (c. 343–263 BC) founded the Hellenistic dynasty in Pergamon, and the name of the unit is derived from his dynasty.

It is quite possible that, prior to the first century B.C., measurement points were calculated using the great Ptolemaic foot, which were later converted to the Roman mile using the formula $\frac{1}{600} \cdot \frac{1}{6.3}$. Since the Ptolemaic foot is $\frac{2}{3}$ of the royal cubit, earlier calculations may predate the Ptolemaic rule in Egypt.

However, the present stadium of the Earth's circumference of 180.000 stadia cannot be older than Eratosthenes' calculations. A large number of measurement points, calculated using the Gallic distance interval based on a circumference of 252.000 stadia, have been included. Thus, the earliest possible date based on Eratosthenes' lifetime is the end of the 3rd century BCE or the beginning of the 2nd century BCE.

For the Gallic circumference of 21.000 short Gallic leagues, an earlier date is possible if Eratosthenes adopted the Gallic calculations and verified them through his own observations. Gallic distances have certainly been calculated for measurement points on the North African coast in present-day Algeria, in Belgica and Germania, on the Cimbrian Peninsula - present-day Denmark - and for river mouths in the Baltic region. Eratosthenes need not have had direct contact with Gaul; the knowledge may also have been adopted by him from other parts of the ancient world.

²⁵ Tac. Ann. 1.54

²⁶ Strabon II,2,2. Strabons Geographika, mit Übersetzung und Kommentar, hrsg. von Stefan Radt. Bd. 1, Göttingen 2002: 233.

²⁷ PAULYS REALENCYCLOPÄDIE DER CLASSISCHEN ALTERTUMSWISSENSCHAFT, Hrsg. von Kroll, Wilhelm, und Mittelhaus, Karl, Zweite Reihe, Sechster Halbband, Artikel Stadion (Metrologie), Stuttgart 1929: 1946 ff.

The use of the value of the short Gallic league and its twelfth part as the stadium value suggests the adoption of older knowledge. Furthermore, the Eratosthenic stadium of 0,1683 km is related to the Gallic league and has no clear relationship to other stadium measures or to the Roman mile²⁸.

The model of 21.000 short Gallic leagues, in which each unit is divided into twelve Eratosthenic stadia, represents an ancient Gallic data model. In pre-Roman antiquity and even before Eratosthenes, who reused it, a calculation of the Earth's circumference must have been made in Gaul that is closer to the Earth's circumference as calculated today than the other ancient calculation we know of.

Merging of different interval sizes

The two different distance intervals show that beneath the surface of the ancient coordinate system, two coordinate systems were merged, each based on different values for the circumference of the Earth. The Gallic distance interval for the circumference of the Earth, amounting to 252.000 stadia or 21.000 short Gallic leagues, was incorporated into the ancient coordinate system. The measurement points contained within it were adopted, at least in part, and are calculated based on the coordinates. In addition to this existing data, further measurement points were newly established in the Gallic distance interval during the 1st century BCE and the 1st century CE. This is evident in the depictions of military campaigns in the Gallic War and the Germanic Wars. Measurement points on the non-Roman side are calculated here using Gallic intervals, whereas Greek distance intervals were used for the calculations on the Roman side.

Regionally, some differences in the use of Gallic and Greek distance intervals can be observed. The circumnavigation of the Cimbrian Peninsula is measured in Gallic intervals. In the Pre-Alpine and Alpine regions, Raetia, and Noricum, only Greek intervals have been found so far. Otherwise, both interval types are usually found side by side.

²⁸ For a variant of $0,1683 \text{ km} / 10 \times 11 = 0,18513 \text{ km}$, which corresponds to nearly one-eighth of the Roman mile of 1.483735 km, the necessary precision is lacking, and furthermore, there is no evidence of an identical calculation method elsewhere using a stadium value. What matters here is what tolerance is considered acceptable.

Part II The Application of ancient mathematical geography

Subjects of Geography

*“For the most part, as I said,
geography relates to the lives
of rulers and their needs...”
(Strabo I,1,18)*

The measurements in the coordinate system and Poseidonius's acceptance of the 180.000-stadium circumference of the Earth suggest that the ancient coordinates, as published by Ptolemy, had direct precursors dating back to the beginning of the first century BCE. The data do not allow us to determine the form that coordinates and measurement points, which likely existed even earlier, took.

Greek and Roman geography from this period onward offers no reliable evidence for the description of a coordinate system, apart from the works of Ptolemy. Of greatest interest are the writings of the Greek-speaking author Strabo, who, at the beginning of the 1st century CE, described the prerequisites for the study of geography and identified geometry and astronomy as paramount, since without them “shapes, lines of latitude, dimensions, and the other related facts cannot be correctly recognized without such a method”²⁹. No further details on this can be found in his work, as he did not consider them necessary for the study of geography.

Strabo's conception of the study of geography, however, contains references elsewhere, specifically regarding the benefits of studying geography. He is concerned with the question of selection, which is a central issue not only for geography but also for history. He begins his *Geographika* with an extensive reference to Homer, the author of the *Iliad* and the *Odyssey*, and views him, from a historical perspective, as the originator of geographical expertise. Homer's descriptions of countries and geographical features hold great value for him, as they teach how to arrive at knowledge and accurate descriptions that can help avoid errors. According to Strabo, these errors are primarily those of military commanders, as he lists such instances. Strabo also mentions Menelaus, King of Sparta, who is mentioned several times by Homer and who was sent to Cyprus, Phoenicia, Egypt, Ethiopia, and Libya, where he became acquainted with those lands. According to Strabo, the knowledge conveyed by the geographer Eratosthenes is also useful for describing countries, for depending on which parallel they lie on and how far west or east they are situated, they differ in terms of heat and cold and in terms of the atmosphere.³⁰

²⁹ Strabons *Geographika* I,1,20. Mit Übersetzung und Kommentar, hrsg. von RADT, STEFAN, Band 1, Göttingen 2002: 27.

³⁰ Strabons *Geographika* I,1,13, Vol. 1: 17.

Finally, he cites the benefits of geographical knowledge:

“It seems to me that the consideration that the greatest part of geography relates to the needs of politics speaks particularly strongly in favor of what we are now discussing. For the earth and the sea that we inhabit are, after all, the stage for deeds—a small part for the small, a great part for the great; the greatest is the whole, which we designate by the specific name ‘inhabited world,’ so that it may be the stage for the greatest deeds; but the greatest deeds are those of the military leaders who are able to rule over land and sea by uniting peoples and cities into a power and political order.”³¹

The needs of politics must certainly be understood as extending beyond the needs of the ruler, since Strabo mentions the various classical political systems—monarchy, aristocracy, and democracy—and discusses the differences between them. Rather, his aim here is to place the Roman political order of his time within a historical continuum that stretches back to the era of the Trojan War, as described by Homer. Just as the Spartan king Menelaus acquired knowledge in foreign lands, the Roman military leaders of Strabo’s time are those who, through the expansion of Roman rule, broadened knowledge and understanding of previously unknown territories.

This is an ancient perspective that, in its fully formulated form, was associated with the conquests of Alexander the Great prior to Strabo’s lifetime. The insights he brought back from the newly conquered territories had transformed Alexandria, the scientific hub of the time, into a center of the learned ancient world.

Strabo is a frequently cited author. We owe him information about other ancient geographical authors, such as Pytheas, Eratosthenes, and Hipparchus, which has not been preserved elsewhere. His philosophical digression on geography, which focuses on the utility of geography for the ruler, has been taken up only rarely, as far as I can tell. However, the Dutch geographer VAN PASSEN did take it up in the mid-20th century in his account of the classical tradition of Greek geography.

“The fact that [Strabo] sets the ‘philosopher’ against the ‘politician,’ and the proposition that the ‘raison d’être’ and purpose of geography are based on the needs of both, apparently emphasizes the dualistic character of Strabo’s work.”³²

VAN PASSEN sees the reason for the dualism of “philosopher” and “politician” in Strabo in the Greek tradition within which Strabo writes and the Greco-Roman audience to whom Strabo addressed himself in his time.

However, in my view, this does not exhaust the concept of a geography addressed to the ruler. Strabo’s aim was likely to orient the content of geography toward its utility for the ruler, given the conditions of his time—namely, the recently established Roman imperial rule.

³¹ Strabons Geographika I,1,16. Mit Übersetzung und Kommentar, hrsg. von RADT, STEFAN, Band 1, Göttingen 2002: 21.

³² VAN PAASSEN, CHRISTIAAN, The Classical Tradition of Geography, Groningen and Jakarta 1957: 9.

Ancient coordinate systems also provide evidence that a ruler-oriented geography prevailed during the Roman Empire. Of interest in this context is Ptolemy, who was active around the middle of the 2nd century CE and who edited the ancient coordinate lists. VAN PAASSEN excludes him, like Strabo, from the classical tradition of geography, which is inevitable given that he lived around the middle of the 2nd century CE. Nor can any philosophical approaches to geography be gleaned from Ptolemy's accompanying texts; his information focuses on aspects of measurement and corrections. Ptolemy himself writes that he includes in geography

“what is related to a general description of the outlines, such as gulfs, major cities, peoples, significant rivers, and other noteworthy things of all kinds”³³.

Ptolemy's “geography is geodesy and cartography and” “he is interested in the dimensions and shape of the inhabited surface of the earth”³⁴,

says VAN PAASSEN, and this is what his accompanying texts on the coordinates reveal.

However, observers³⁵ noticed early on that Ptolemy's coordinate catalogs do not always align with this theoretical approach to geography, and that the coordinates include some associated with military commanders and members of the Roman imperial family. In the area between the Seine, Rhône, and Elbe, these are the coordinates **Kaisaromagos 1,2**, meaning *Caesar's Place*, which can be attributed to *Caesar*. **Bomoi Flavio**, meaning *Altar of the Flavians*, can be attributed to the Roman Flavian dynasty. The elder Drusus is associated with **Tropeu Druson** (probably *Reversal of Drusus*), the elder or younger Agrippina **with Agrippineensei** (*Fallen Agrippina*), and the later Emperor Tiberius with **Foros Tiberiou** (*Way of Tiberius*). It is possible that the Roman Emperor Trajan is represented by **Traine Legi**³⁶. These coordinates have little to do with an overall representation or geodetic aspects; indeed, the question arises as to what purpose the mention of rulers and Roman politicians—who are typically part of event-oriented historiography—serves in a geographical representation.

Part I has shown that coordinates do not mark a point on the Earth's surface. From them, measurement points on the Earth's surface are determined at intervals. It can be assumed that these measurement points are connected to the politicians and rulers and that the measurement points can be interpreted with the help of the coordinate designation.

There are more than thirty measurement points associated with **Kaisaromagos 1,2** that correspond to these two coordinates. Some can certainly be linked to Caesar's military campaign during the Gallic Wars. This applies to the locations of the historically recorded battles on the rivers Axona and Sabis, now known as the **Aisne** and **Selle**. The measurement point **Mainz Kastel on the Rhine** indicates Caesar's crossing of the Rhine, likely his second crossing. The measurement point **Boulogne-sur-Mer Plage** is likely Portus Itius. The measurement point **Geneva Rue de Beaulieu 1** marks the position of Caesar's military units that prevented the Helvetii from migrating north of the Rhône River.

³³ Ptolemy cited from the German translation in STÜCKELBERGER / GRASSHOFF, Vol. 1: 53.

³⁴ VAN PAASSEN, CHRISTIAAN, *The Classical Tradition of Geography*, Groningen / Jakarta 1957: 2.

³⁵ Already in HOFMANN, JOHANN JACOB, *Lexicon Universale*

³⁶ The translations have been adapted to suit the perspective of a modern readership. For details on the translations, see the notes under the respective entry.

The two sets of coordinates thus yield more than 15 times as many measurement points. A connection to Caesar's campaigns cannot be established so clearly in all cases. Here, the decisive factor is how the correlations are to be interpreted. The measurement points in Grand, Besançon, and Mainz—**Grand Place de la Fontaine, Besançon Palais Granvelle, and Mainz Grosse Langgasse**—are located in the historical centers of these towns. A link to the Greek distance interval with the coordinate **Kaisaromagos 1,2** is to be understood as the founding or refounding of the town by Caesar.

This demonstrates that the mathematical representation contained in the ancient coordinates overlaps with the main field of application of geography, as described by Strabo. The ancient coordinates refer to a significant extent to the lives of military leaders and rulers and depict what was worthy of recognition. Here, the substantive approach of the geography of coordinates converges with Strabo's geography.

It would be an oversimplification to view geography solely as a record of the deeds of rulers or military commanders. These coordinates also contain a historiography in which numbers, coordinates, distance intervals, and measurement points speak to events worthy of note. Among these are the boundaries of Roman power. The **Werbelt Raebel** measurement point marks the spot on the Elbe where the Roman general Drusus turned back and led the Roman legions home after a woman of superhuman stature had confronted him and prophesied his imminent demise³⁷. Drusus's retreat at the Elbe River, as an ancient topos, has its counterpart in Alexander's retreat at the Hyphasis River, which marked the end of his Indian campaign³⁸.

The defeat Rome suffered in Germania, in which the Roman governor Varus lost three legions and his life, is worthy of being depicted in the geography. From the coordinates **Agrippinensis / Conquered observation post of the Ikosians, Bonna 1 Legio I Minervia, Nauaision 1, Ouegera 1 Legio XXX Ulpia**, the Roman position at the Vehrte measurement point near Kalkriese is calculated using Greek distance intervals. At a distance of 5,5 kilometers, northeast of the Wiehengebirge, were the positions of the Germanic troops, at the **Schwagstorf 1,2 measurement points**. Strabo also mentions the defeat against the Germans, in which the Romans lacked local knowledge and Rome's opponents

"let the terrain fight for them in inaccessible swamps and forests and in desolate areas"³⁹.

The historiography of the coordinates is not a panegyric, but stems from a picture in which the rulers are embedded in a world of ancient peoples, some of whom we know only through their mention in the coordinate registers. The connection through numbers brings the ancient peoples into the Roman horizon of understanding and action. Thus, the Lakoi, an ethnos whose settlements **of Toulon and Nasion** were located on the upper Meuse and Moselle, took part alongside the Sequanii and Roman troops under Caesar's command in the defense against the

³⁷ Cass. Dio. 55. I. 3. Zit. nach CASSIUS DIO, Römische Geschichte, Übersetzung von Leonhard Tafel, Wiesbaden 2012: 620.

³⁸ TIMPE, DIETER, Drusus' Umkehr an der Elbe. In: Rheinisches Museum für Philologie N.F. 110, 1967: 291.

³⁹ Strabons Geographika I, 1, 17. Mit Übersetzung und Kommentar, hrsg. von RADT, STEFAN, Band 1, Göttingen 2002: 25.

Helvetii north of the present-day city of Geneva. The Lakoi, as indicated by the linkages of coordinates and measurement points, are relatives of the Spartans in Greece—that is, Dorians; both are linked to the coordinates **Laktron 1,2** (see the entries for Toullon, Boiodouron, and Gauonarion).

The Tribokker ethnic group is mentioned in the geography of the coordinates and by Strabo. According to Strabo, the group lived on the western side of the Rhine in his time, but had previously been settled on the eastern side of the Rhine as a Germanic people⁴⁰. The coordinates identify **Elkebos** as the polis of the Tribokkers. The analyzed measurement points indicate an older settlement area east of the Rhine along the Elz River (measurement point: **source of the Elz**) as well as near the town of Elzach north of the city of Freiburg (measurement point: **Elzach**). The settlement west of the Rhine was established near the present-day town of Esch-sur-Alzette (measurement point **Esch-sur-Alzette Rue de Belvaux**) with Roman support or at least with their approval, as evidenced by the link between the measurement point and **Kaisaromagos 2**.

In Germania, which lies east of the Rhine, the coordinates are listed without any mention of ethnic groups; the ethnic groups are listed separately in another section of the text. In Germania, the measurement points also often refer to bodies of water or locations along waterways, such as **Alsison** for the Sieg River, **Louppia** for a type of river with slow-moving water, **Fagaron** for river sources, **Lefana** for a water goddess or a marsh, and **Bibakon** for locations along the Sulz River.

The situation west of the Rhine is not fundamentally different. Here, too, measurement points corresponding to coordinates designate rivers where one would not expect them, such as the coordinate **Ouetorra** for the Rur/Roer River and the coordinate **Argentoraton** for the Ehn River.

PENDERS has pointed out the increase in the depiction of rivers and river deities in artistic representations during the 1st and 2nd centuries CE. According to his findings, this is a Roman rather than a Hellenistic phenomenon, involving depictions of the type of reclining river deities⁴¹. According to PENDERS, this type originated in Alexandria around 150–100 BC and was adopted as a motif by Emperor Vespasian in Rome, where it became more widespread in depictions. The Flavian emperor Domitian, to illustrate his triumph over the Chatti tribe on the right bank of the Rhine, had himself depicted as the victor over the river goddess of the Rhine in a statue in the Forum in Rome⁴².

In the coordinates, the Flavians are represented by the coordinate "**Bomoi Flavio**," which is linked to the measurement point "**Neckar Source Schwenningen**" and indicates the Flavians' victory and their control over the Neckar River.

The prevalence of the motif of reclining river deities in Roman antiquity from around the middle of the 1st century CE and the strong presence of river measurement points in the

⁴⁰ STRABON: IV, 3,4.

⁴¹ PENDERS, STEFAN, Imperial Waters, Roman river god art in context, Master's Thesis, Leiden 2012: 6,11. <https://hdl.handle.net/1887/19796>

⁴² There are differing interpretations of the statue. It is not possible to conclusively determine here whether it should be included in the depiction of river deities based on this interpretation.

coordinates are likely no coincidence, especially since the origin of the motif in both cases was Alexandria, the place where the coordinates were preserved and edited. Given the extensive presence of river depictions in the coordinates, an Alexandrian-Roman symbiosis in the use of the motif can certainly be assumed.

Variants

The number of different coordinates ranges from approximately 6,500 to 10,500, depending on the count. This wide range stems from the fact that some manuscripts list different values for longitude and latitude for a single coordinate, or the designations in the manuscripts differ from one another. In such cases, the question arises as to whether these are variants of a single coordinate or two distinct coordinates. The variants can be traced back to Ptolemy's marginal notes, as the ancient historian OTTO CUNTZ determined in a comparison of the manuscripts⁴³.

The possible perspectives can be illustrated with examples. For the coordinate located in Germania, with the designation *Teuderium* - already Latinized by CUNTZ⁴⁴ - different specifications regarding longitude and latitude are given in Codex Vaticanus Graecus 177 and Codex Vaticanus Graecus 191. Furthermore, the designations differ from one another. First, we must refer to the two Greek names *Taderion* and *Tatorion*; the Latin reading according to CUNTZ cannot be derived from the codices. The different names from the Ω and X recensions: *Taderion* (Cod. Vat. Gr. 177) and *Tatorion* (Cod. Vat. Gr. 191).

The Greek term *Taderion* can certainly be translated as *battlefield*, since the coordinate is associated with several battle sites (see the entry for *Taderion*). *Tatorion* has not been fully interpreted; *-tor-* can be understood in Germanic as *access*, *entrance*, *crossing*, or *gate* (see the entry for *Tatorion*); *Oue-tor-ra* is a parallel case that also contains *-tor-* and refers to the mouth of a river. *Taderion* and *Tatorion* are thus certainly two distinct coordinates and not variants of a single coordinate.

Another coordinate has the different names **Feugaron** and **Fagaron** in the two codices; in both cases, the specified longitude and latitude are the same (see the entry for this). *Fagaron* refers to a place with river springs; for *Feugaron*, there is no convincingly derivable etymology. It is conceivable that the specification of a longitude and latitude here refers to different places.

The same question arises for the coordinates **Gesoriakon** and **Tisoriakon**, for which different longitudes and latitudes are given: are these two distinct coordinates or variants of a single coordinate? Since both are linked to different measurement points, they must be distinct coordinates.

Coordinates with the same longitude and latitude but significantly different names - such as Polei **Usbium (Vebium)** and **Arelape**, as listed by STÜCKELBERGER / GRASSHOFF⁴⁵ - pose no

⁴³ CUNTZ, OTTO, Die Geographie des Ptolemaeus, Galliae, Germania, Raetia, Noricum, Pannoniae, Illyricum, Italia, Berlin 1923: 15.

⁴⁴ in STÜCKELBERGER / GRASSHOFF; bei CUNTZ *Teuderion*: 67.

⁴⁵ STÜCKELBERGER / GRASSHOFF, Vol. 1: 235, 241.

problem. Since the longitude and latitude of a coordinate do not correspond to a physical location on the Earth's surface, it is not an issue that the same longitude and latitude are specified for both.

Coordinate Descriptions

What can be expected from coordinate designations? For one thing, a coordinate specifying longitude and latitude indicates a point on the Earth's surface. As is well known, ancient coordinates do not directly specify a point on the Earth's surface, but they enable a point on the Earth's surface to be measured using a method analogous to triangulation. As shown, the measurement uses intervals and achieves a high degree of accuracy of a few meters. Thus, ancient coordinates also lead to a point on the Earth's surface via an intermediate step.

One part of the coordinate designation thus describes the method for determining a point on the Earth's surface. The other part of the coordinate designation contains text that describes this point on the Earth's surface or simply a point within the coordinate system. In this context, one must not view the points and designations through the lens of a modern user. In antiquity, different points were often important, and the designations are based on what could be expected of users of the coordinate catalog 2.000 years ago.

Does the reference to the coordinate **Tropeu Druson** therefore mean that the younger Drusus erected a *victory monument* near the Weser River in A.D. 16⁴⁶, or does it refer to the older Drusus's *retreat* along the Elbe River in 9 B.C.? Here, philological methods must first identify possible interpretations. Linguistics is called upon. In this case, the text ultimately does not allow us to determine which variant is correct. As it turns out, however, it will be possible to do so based on the measured point on the Earth's surface.

The situation is somewhat simpler with points that have changed little or not at all over the past 2.000 years, such as river sources and, in some cases, river mouths. When comparing ancient river sources with modern ones, it should be noted that different points of origin have been designated for some rivers today. Thus, the **head of the Danoubios** does not refer to the modern source of the Danube at the confluence of the Breg and Brigach near Donaueschingen. The coordinate **head of the Danoubios** is linked via a distance interval to the measurement point **source of the Breg**, one of the two source rivers of the Danube. The source of the Breg is to be understood as the ancient head of the Danoubios. A comparison between the present-day source of the Breg and the measurement point of the ancient source of the Breg shows a deviation of only 26 meters, indicating that the source location has hardly changed.

The **Louppia coordinate** is linked to a whole series of river courses and characterizes them as a gentle, calm river course. For the Lippe River, this looks as follows:

EPSG 4326: Louppia coordinate, lon 11.258389191845287, lat 52.283384187216804, with a Greek distance interval of 13,0666, which corresponds to 176,2488341 km = measurement

⁴⁶ STÜCKELBERGER / GRASSHOFF, Bd. 1: 233.

point Bad Lippspringe, source of the Lippe, lon 8.8222623728, lat 51.7815938186. The deviation from the current source basin of the Lippe is only about 20 meters.

Coordinates: Louppia, longitude 11.258389191845287, lat 52.283384187216804, with a Greek distance interval of 24,2083, which corresponds to 326,53365455 km = measurement point Wesel Citadel – confluence of the Lippe and the Rhine, lon 6.6176300669, lat 51.6515578324.

The modern meaning of the name Lippe, a part of the human mouth, has nothing to do with the ancient meaning of Louppia. *Lou-* was used as a term for a body of water or a watercourse and is close to Greek, without belonging to the well-known Classical Greek. *-pia-* can be etymologized as Latin and stands for a mild, calm course of the river. The modern-day Lippe must therefore have been understood by those who named it as a calm river.

Just as the coordinate **Louppia** refers to a multitude of measurement points, the coordinate **Bonna** also refers to a multitude of measurement points. **Bonna** is listed with two different sets of longitude and latitude coordinates. The analysis for the coordinate **Bonna 1,2** shows 50 measurement points, five of which have a phonetic similarity to the coordinate designation. These are **Bodman Altbodman, Bohnte Ovelgoenne, Bomlitz Am Hoop, Bonn Colmantstrasse, Boué Le Pavillon**. In addition, there is another measurement point, **Annaba Rond Point Joannonville**, which formerly bore the name **Bône**. The Gallic word *bona* means a village or municipality and appears in various forms⁴⁷. There is also a form *bou-* for municipality and as a patronymic, which exists in present-day Algeria.

The term **Bonna** thus initially simply means a place or municipality, but presumably refers to specific places that expressed commonalities based on their name. This may indicate a shared origin.

For linking via an interval, the distance over which this occurs is irrelevant, as long as an interval exists. A coordinate can, for example, be linked to a measurement point in present-day France and to another measurement point located in present-day Greece.

One example is the Lakoi, an ethnic group in the territory of present-day France, also known as the Leuki, but listed as Lakoi in the coordinate descriptions. Their polis was present-day Toul. The point marking the location on the Earth's surface—the measurement point—is located in **Toul, Rue de la Petite Boucherie**. This measurement point is linked via the Gallic interval 114,066 to the coordinate **Laktron 1**. The coordinate **Laktron 1** is linked via the Gallic distance interval 37 to the measurement point **Sparta ancient Acropolis**. The Lakoi and Laktron ethnic groups are to be understood together and, due to their connection with the ancient Acropolis of Sparta, are identified as Lacedaemonians. The Lakoi, inhabitants of the Upper Moselle, and the inhabitants of the region of Laconia on the Peloponnese are listed as related ethnic groups.

The localizations calculated in this study suggest that the place names and proper names identified in the codices within the European humanist tradition should not generally be understood as translations of Latin or Latinized place names into Greek. Just how stubbornly established classifications persist is demonstrated by the identification of the coordinate

⁴⁷ DELAMARRE, XAVIER: 82.

Kastellon with the northern French city of Cassel, which can be found in STÜCKELBERGER / GRASSHOFF⁴⁸, and which is based on the widely circulated and frequently translated edition of Jean-Baptiste Bourguignon d'Anville's⁴⁹ *Géographie ancienne abrégée* from 1768, in which the Latinized form *Castellum* is identified with *Cassel*. However, this is not the place in this study to discuss the history of research in detail.

Regarding the history of the city of Cologne and the coordinate assigned to it in the coordinate index, the following difference emerges between the classical view and the new analysis: In Cod. Vat. Gr. 177, the coordinate is designated as **Conquered Observation Point of the Iksians**, while in Cod. Vat. Gr. 191, it is designated as **Agrippineensei**. STÜCKELBERGER / GRASSHOFF, following CUNTZ's lead⁵⁰, emend this to "Agrippinensis" and add "Colonia," a term not found in the codices. The reference must therefore pertain to Colonia Agrippinensis, Roman Cologne. The designation from Cod. Vat. Gr. 177 was not adopted at all and was presumably regarded as corrupt.

Calculating the measurement points for the coordinate yields a measurement point with a Greek distance, **Cologne Roman Harbor Road**, which can almost certainly be associated with Roman Cologne and its function as a port. In addition, Cologne has a second measurement point calculated using Gallic and Greek distances: the measurement point **Cologne, Sankt Aposteln**. This measurement point is primarily calculated from present-day northern France and indicates Cologne's early integration into this region, as well as supra-regional contacts extending as far as North Africa. This second measurement point has nothing to do with the coordinate **Agrippineensei**. The coordinate index thus yields not just one location within the territory of present-day Cologne, but two locations: one pre-Roman and one Roman. The **conquered observation point of the Iksians** is not a corrupted entry but refers to the measurement point **Wolkenburg near Rhöndorf** am Rhein.

It becomes apparent that, due to the precise localization of the measurement points - accurate to within a few meters - a spatially unambiguous picture emerges that can serve as a basis for interpreting the coordinate designations. The calculations of measurement points thus do not necessitate a blanket rejection of previous research findings. Furthermore, it is now possible to gain an initial understanding of coordinate designations, as in the case of the previously overlooked **Wolkenburg near Rhöndorf**.

⁴⁸ STÜCKELBERGER / GRASSHOFF, Vol. 1: 211.

⁴⁹ D'ANVILLE, JEAN-BAPTISTE BOURGUIGNON, *Géographie ancienne abrégée*, Vol. 1, Paris 1768: 86.

⁵⁰ CUNTZ, OTTO, *Die Geographie des Ptolemaeus*, Berlin 1923: 54.

Part III Coordinates and measurement points outside the study area

North Africa: The region of present-day Algeria and Tunisia

There were connections from regions in what are now Algeria and Tunisia to Gallia Belgica and Germania. This can be substantiated by several coordinates and their measurement points.

One piece of evidence for this is the coordinate **Agrippineensei** (Cod. Vat. Gr. 191) / **conquered observation point of the Ikosians** (Cod. Vat. Gr. 177). The coordinate is listed under Belgica, but the name Ikosians refers to the coordinate Ikosion, today's Algiers in North Africa. The measurement point to which the designation **conquered observation point of the Ikosians** from Cod. Vat. Gr. 177 refers is the mountain **Wolkenburg near Rhöndorf** on the Rhine. According to this, Ikosians were located here, far away from the polis of Ikosion. The **Wolkenburg** measurement point has a direct connection to the polis of Ikosion in North Africa, as it is also linked to the **Ikosion** coordinate via a distance interval.

In North Africa, there are seven coordinates that have measurement points in Belgica or Germania: these are the coordinates **Kastra German 1,2**, **Ikosion**, **Germiana 1,2**, and **Ippon Basilikos 1,2**. Of a total of approximately 25 measurement points, seven lie in a spatial focal point between the Rhine and Sieg rivers on one side and the Rur/Roer and Wurm rivers flowing on the left bank of the Rhine on the other.

For eleven measurement points in the Belgica and Germania, it is clear that their locations are related to maritime shipping; five measurement points clearly mark river entrances from the sea: these are **Winsen / Luhe Marktstrasse** (entrance to the Luhe and the Ilmenau), **Mellum 2** (access to the Weser), **Kampen** (access to the IJssel), **Maasdam Vogelbuurt** (access to the Waal, Meuse, and Rhine), and **Roermond Roode Brug** (access to the Roer/Rur and the Wurm).

In the coastal region of North Africa, there are measurement points that link via distance intervals with coordinates from **Germania** and **Gallia**. First and foremost is the **measurement point Algiers Rue Hadj Omar**, which links to the coordinates of Belgica **Ition Akron 1**, **Samarobrioua 2**, and **the western mouth of the Renos**, as well as to the coordinate **Tatorion (2)** from Germania. According to this, there were connections from Belgica and Germania to the ancient predecessor settlement of present-day Algiers.

Second is a measurement point in Algeria near the **town of Sidi Bellatar** on the lower reaches of the **Chelif River**, about 16 km upstream from where the river flows into the Mediterranean Sea, which aligns with coordinates from the Belgica and the Germania. The coordinates are **Stereontion 2** and **Aliso** in the Germania and **Augousta Oiromanduagon** in the Belgica. This

indicates that there were further contacts with North Africa from the Belgica and the Germania.

Two additional measurement points each have a corresponding coordinate in the Belgica and the Germania, respectively. The **Annaba Route vers El Hadjar** measurement point corresponds to the coordinate **Bonna 2**, while the **El-Jennah** measurement point **on the Oued El Kebir River**—the ancient Ampaga—corresponds to the coordinate **Nabalia 2** in the Germania.

The connections between the North African coastal region and the Belgica and Germania thus existed in both directions.

Kastra German

Κάστρα γερμαν, Καστρα γερμαν
Kastra German

Measurement points

Annaba, Route vers El Hadjar

Constantine, Maternite

El-Jennah

Katwijk, Hoorneslaan

Krefeld-Cracau, Schubertstrasse

Loon-Plage, Rue du Moulin

Otzenhausen, Kahlenberg

Roermond, Roode Brug

Sidi Bellatar, am Fluss Chelif

The location corresponding to these coordinates is near Sidi Bellatar on the Cheliff River in Algeria. It is conceivable that **Kastra** is derived from the Latin *castrum*, meaning *fortification* or *fort*. **Kastra** would be the plural form. **German** would then be the genitive case and should be read as *Germanorum*. The meaning would be *fortresses of the Germanic peoples*⁵¹. According to GSELL, there is no archaeological evidence of a fortress at the Sidi Bellatar location⁵². The location on the river, about 15 kilometers from where the river flows into the sea, also suggests a landing site for ships rather than a site for one or more fortresses.

It is therefore likely that **Kastra German** should be interpreted differently. There may be a crasis of *Ka-* (meaning *ship*) and *the* Greek *-astra* (meaning *stars* in the nominative or accusative case), i.e., *ship stars* that guide the ship's course. *German* could then refer to the region toward which the stars point.

⁵¹ STÜCKELBERGER / GRASSHOFF, Vol. 1: 391.

⁵² GSELL, STÉPHANE, Atlas Archéologique de l'Algérie, Algiers and Paris 1911.

GRIMM⁵³ has pointed out that the name of the Germanic peoples first appeared on the left bank of the Rhine, in an area of the Lower Rhine that later became a Roman province. He refers to the passage in Tacitus,

“ceterum Germaniae vocabulum recens et nuper additum, quoniam qui primi Rhenum transgressi Gallos expulerint ac nunc Tungri, tunc Germani vocati sint.”⁵⁴

The coordinate designations frequently include *Ger-*. In addition to **Kastra German**, there is also **Germiana** in North Africa and, on the left bank of the Rhine in the border region of Germany, the Netherlands, and France, **Oue-ger-ra 1**. The three coordinates share the **Krefeld-Cracau measurement point** and the **Roermond Roode Brug measurement point**, where the Roer / Rur River flows into the Meuse. It is conceivable that the name of the Germanic peoples first appeared in this region.

The connections indicate that there was close interaction with North Africa, which fits in with other connections to **Karchedon**, **Ikosion** etc.

Ikosion

Ἰκόσιον, ἰκόσιον

Ikosion

Algiers, Algeria

Measurement points

Algier, Rue Hadj Omar

Annaba, Rond Point Joannonville

Annaba, Route vers El Hadjar

Constantine, Maternite

Sidi Bellatar, am Fluss Chelif

Chateau-Thierry, Rue de la Barre

Loon-Plage, Rue du Moulin

Roermond, Roode Brug

Uphusen, Zum Uphuser Meer

Riepe bei Ihlow

Köln, St. Aposteln

Wolkenburg, Rhöndorf

⁵³ GRIMM, JACOB, Geschichte der deutschen Sprache, Vol. 1, 2nd ed., Leipzig 1853: 545.

⁵⁴ P. CORNELIUS TACITUS, Germania, übersetzt von Manfred Fuhrmann, 2. ergänzte Auflage, Stuttgart 2000: 7.

The **coordinate Ikosion** is linked to the **measurement point in Algiers, Rue Hadj Omar**, in the Kasbah area, the location where the ancient settlement in Algiers is believed to have been situated.

The **measurement point** in the area of modern-day Algiers, **Algiers, Rue Hadj Omar**, in turn links to two **coordinates** in Belgica, **Ition Akron 1** and **Samarobrioua 2**, as well as to two **coordinates** in Germania, the **western mouth of the Renos** and **Tatorion 2**. The ancient predecessor settlement in the area of modern-day Algiers was thus connected to areas in Belgica and Germania.

Conversely, connections also existed from coordinates in North Africa to measurement points in Germania. The coordinate **Ikosion**, with its measurement point in Algiers, links to measurement points in **Belgica** and **Germania**. In Germania, these are measurement points in the area of the Ems River estuary, near **Uphusen (Zum Uphuser Meer)**, and near **Riepe bei Ihlow**.

The measurement points at **Algiers (Rue Hadj Omar)** and **Uphusen (Zum Uphuser Meer)** were thus connected. Since both measurement points have access to the sea, a connection by sea across the Atlantic is more plausible than trade via land and across the Mediterranean.

Another area in Germania or Belgica is also connected to the earlier settlement in the region of present-day Algiers. This is the area along the Rhine between the modern city of Cologne and Rhöndorf, located about 37 km upstream from Cologne.

The coordinate from Vat. Gr. 177 ἀρε σπιτη ικοσης, meaning **conquered observation point of the Ikosians**, refers to the measurement point Wolkenburg near Rhöndorf, a mountain approximately 300 meters high situated on the Rhine. This was used by the Ikosians.

The same conclusion follows from the association of the coordinate **Ikosion** with the measurement point **Wolkenburg near Rhöndorf**, which is clearly attributed to the North African Ikosians. The connection between Wolkenburg and the Ikosians is thus doubly substantiated.

Another link for the Ikosion coordinate exists with the measurement point **Köln, St. Aposteln**.

The linkage of **Ikosion** with the measurement point **Chateau-Thierry Rue de la Barre** places the coordinate among particularly important measurement points linked to it; these are 0 lon 90 lat (0° longitude, 90° north latitude), **Alexandreia**, **Dourokottoron**, **Karchedon**, **Samarobrioua 2**.

On the etymology: Modern-day *Algiers*, Latin *Icosium*, Greek ἰκόσιον, *Ikosion*; according to Pellegrin, Punic⁵⁵ *Ikosim*; according to Ghaki, Punic *WYKSM*⁵⁶. The name of the ethnic group is, according to Vat. Gr. 177, ικοσησ, *Ikoses*. According to Pellegrin, the morpheme *Ik-* is well attested in the Berber linguistic nomenclature for Algeria; *ikhf* or *ighf* means *head*, and in a

⁵⁵ PELLEGRIN, ARTHUR, Essai sur les Noms de lieux d'Algérie et de Tunisie, Tunis 1949 : 124.

⁵⁶ GHAKI, MANSOUR, Toponymie et onomastique libyques. L'apport de l'écriture punique/néopunique. Quaderni di Studi Berberi e Libico-berberi, 4, Il Torcoliere, UNIOR, 2015, Napoli.: 66.

broader sense also *peak* or *summit of mountains*. In French *pic*. *Ikhfoum Ergaz* – Eng. *The head of a person*⁵⁷ .

The Casbah of Algiers is situated on a mountain; *Ik-* is thought to refer to this. The remaining part of the word is *-sion* or *-sim*. Σιος, *sios*, constitutes the Laconic variety of Greek for Gr. Θεός, *Teos*, Eng. *God*, or also, in the plural, *gods*.

This results in the name *Mountain of God* or *Mountain of the Gods*. In antiquity, the Pillars of Heracles were known, marking the Strait of Gibraltar to the north and south. The name of the mountain near Algiers could therefore well have been understood as *Mountain of God* or *Mountain of the Gods*.

Ampaga Estuary

Measurement points

Annaba, Rond Point Joannonville

Constantine, Maternite

El-Jennah

El-Jennah on the Oued El Kebir (river)

Ampaga Estuary

Germiana 1,2

Γερμιάνα, Γερμιάα

Germiana, Germiaua

Measurement points

Annaba, Rond Point Joannonville (DZ)

Annaba, Route vers El Hadjar (DZ)

Constantine, Maternite (DZ)

Kerkrade, Kasteel Erenstein (NL)

Roermond, Roode Brug (NL)

Leerdam, Allg. Begraafplaats (NL)

Maasdam Vogelbuurt (NL)

Bohmte, Ovelgoenne (DE)

⁵⁷ PELLEGRIN, ARTHUR: 63.

Köln, Römische Hafenstrasse (DE)
Krefeld-Cracau, Schubertstrasse (DE)
Mellum 2 (DE)
Stedere Ziegeleiweg bei Gehrden (DE)
Steterburg, Thiede (DE)

The measurement points for **coordinate Germiana 1,2** indicate the access routes from the sea into the river systems of Germania. In the north, the access route into the Weser is marked by the point of the ancient Weser estuary near the present-day island of **Mellum**. The access routes from the sea into the Meuse and Rhine are marked by the measurement points at **Maasdam on the Oude Maas** and at **Leerdam north of the Waal**. Along the Maas, the access point to the Rur/Roer is marked at the river's confluence. Upstream on the Rur and further upstream on the Wurm, there is a measurement point near **Kerkrade**.

In North Africa, three measurement points have been identified so far for the coordinate **Germiana 1,2**: two in the city of **Annaba** and one in the city of **Constantine**.

Ippon Basilikos 1,2

Ἴππων Βασιλικός
Ippon Basilikos

Measurement points
Alexandria, Cape Lochias
Annaba, Rond Point Joannonville (DZ)
Annaba, Route vers El Hadjar (DZ)

Bodman, Altbodman
Bomlitz, Am Hoop
Bonn, Colmantstrasse
Erft-Übergang und Einmündung des Norfbaches in die Erft.
Kampen Koornmarkt
Leerdam, Allg. Begraafplaats
Otzenhausen, Kahlenberg
Stade, Hökerstrasse
Traben, Rieslingstrasse
Verdun, Citadelle
Winsen / Luhe Marktstrasseinsen / Luhe Marktstrasse
Wyk auf Föhr, Am Hafen

In North Africa, the coordinate designation **Ippon Basilikos** refers to two measurement points in the modern city of **Annaba**, Algeria. Until the end of French colonial rule, the city was known as **Bône**. In ancient times, the Roman city of **Hippo Regius** was located in the area of the modern city. What is striking about the connection between this coordinate and the

measurement points **Bonn Colmantstrasse**, **Bodmann Altbodman**, and **Bomlitz Am Hoop** is the initial sound *Bo-* (see also the entry for the coordinate **Bonna**). We also find a similar initial sound in the historical name *Bôna* for the modern city of Annaba. In Algeria, the form *Bou-* is common in toponyms and personal names and signifies belonging to something or descent from someone or something.

DELAMARRE⁵⁸ points out that the Gallic *bona* is frequently found in toponyms to denote a locality or community, e.g., in *Bonna* (Bonn), *U-indo-bona* (Vienna), and *Bononia* (Boulogne-sur-Mer). He places the Gallic *bona* alongside the Old Irish form *bun-*, meaning *base, root, or posterior part*. It should be added that the entry for **Bonna** links to several modern places with similar names, including *Bonn*, *Bodman*, *Bomlitz*, *Boué* and *Bohmte*.

Geographically, place names beginning with *Bo-* or *Bou-* are therefore widespread and not limited to Europe. This prefix was once an expression of something or someone's affiliation or origin. In the coordinates, these places are linked to the **coordinates Ippon Basilikos** and **Bonna**; thus, in antiquity, places beginning with *Bo-* or *Bou-* were associated with a connection that bridged the distance between North Africa and the Rhine.

The coordinate **Ippon Basilikos** is also linked, via distance intervals, to landing sites in Germania. Near the Rhine, the **crossing of the Erft** and **the confluence of the Norfbach with the Erft** serve as measurement points, and at **Kampen, the mouth of the IJssel**. Slightly north of the Waal is **Leerdam, Allg. Begraafplaats**, a measurement point. On the Lower Elbe lies the measurement point **Winsen / Luhe Marktstrasse**, and on the German North Sea coast, the measurement point **Wyk auf Föhr, Am Hafen**.

Karchedon

Καρχηδων

Karchedon

Measurement points

Annaba, Rond Point Joannonville

Annaba, Route vers El Hadjar

Cambrai, Place du 9 Octobre

Cap Gris-Nez

Chateau-Thierry, Rue de la Barre

Karthago, Galeerenhafen

Katwijk, Hoorneslaan

Kleve, Emmericher Strasse

Marseille, Rue Fort du Sanctuaire

Sparta, ant. Akropolis

Trier, Kaiserthermen

Tyrus, Elias Sharbeen

⁵⁸ DELAMARRE, XAVIER: 82.

For etymology, see “Designation ka- / kat- for ship”.

The **coordinate Karchedon** links, via Gallic distance, the **galley port of Carthage** (modern-day Tunisia) with the **northern port of Tyre** (modern-day Lebanon). Additional measurement points are located in **Marseille** and ancient **Sparta**. This is certainly only a small selection of the measurement points.

In the area between the Seine and the Elbe, measurement points using Gallic distances are located at **Cap Gris-Nez, in Cambrai, Chateau-Thierry Rue de la Barre, in Katwijk, Kleve, and Trier**; the area is thus mapped beyond the river mouths.

The coordinate **Kastellon**, meaning *shipbuilder*, is linked via a Gallic distance to the **galley port of Carthage**; in the opposite direction, the coordinate **Karchedon** is linked to the measurement point **Kleve of the Kastellon** coordinate. This indicates a close connection between Punic naval supremacy and shipbuilding and trade in the coastal region between northern France and northern Germany.

The links via Greek distances are with **Annaba, Cambrai, Château-Thierry Rue de la Barre and Trier**.

Eastern Mediterranean

Measurement point Sparta

The **Sparta** measurement point (**ancient Acropolis**) links via Greek distance intervals to the coordinates **Karchedon, Laktron 2, Rhodes, and Toulon 1**. It also links via a Gallic distance interval to the coordinate **Laktron 2**.

Istanbul measurement point

The **Istanbul Tersane Cd.** measurement point is linked via the Gallic distance interval to the coordinates **Busantion-Byzantium, Massilia, Rhodes**, and to **Athos, Cape and City**.

Measurement points Rhodes City and Kizil Ada

The entry for Rhodes is not found in Codices Vat. Gr. 177 and 191. STÜCKELBERGER /GRASSHOFF emend and adopt the coordinate entry for **Lindos** from Cod. Vat. Gr. 177 for Rhodes. Since the coordinate, with the Greek distance interval 68, links to the measurement point **Rhodes City Sofokleous**, the emendation is correct.

There is a measurement point in **Rhodes City, Sofokleous**, which, using the Greek distance, links to the coordinates of **Alexandria, Lindos (Rhodos)**, and **Massilia**.

Another measurement point is located in the Rhodian Peraia, on the mainland coast opposite the northeastern tip of the island. The **Kizil Ada** measurement point is situated there in the coastal waters and is linked to the coordinates **Alexandreia, Busantion-Byzantium, Laktron 1, Lindos (Rhodos)**, and the **Tanais estuary (western mouth of the Tanais)**.

Measurement point Tyre, North Harbor

The **Tyros / Tyre North Harbor** measurement point, **Elias Sharbeen**, links via a Gallic distance interval to the coordinates of **Karchedon, Lindos (Rhodos)**, and **Alexandreia**.

Measurement point Alexandria, Cape Lochias

The measurement point is located in **Alexandria, Cape Lochias**. The measurement point is linked via Greek distance to the coordinates of **Alexandreia, Busantion-Byzantium, Dourokottoron, Ippon Basilikos 2, Lindos (Rhodos)**, and the **Tanais estuary (western mouth of the Tanais)**.

Cimbrian Peninsula

The representation of the Cimbrian Peninsula consists of two constructions. The **western part** encompasses the North Sea coast from the mouth of the Elbe to Cape Skagen. The **eastern part** encompasses the area extending southeast from Skagen and is partially shifted northward and eastward.

The North Sea coast in the western part, from southwest to northeast, includes the coordinates (KIM = Cimbrian Peninsula):

- Elbe estuary, with the **Neuwerk** measurement point
- KIM foreshore north of the Elbe estuary, with the measurement point **Friedrichskoog, west of the town**
- KIM Islands of the Saxons, with the measurement point **Wyk auf Föhr, Am Hafen** (see also below)
- KIM Next foreshore
- KIM Northernmost foreshore 2
- KIM Northernmost foreshore 1, with a measurement point at **Cape Skagen**

The area east of Cape Skagen includes, listed from north to south:

- KIM First headland after the headland, with the **Kvissel** measurement point
- KIM Next headland south of the headland, also with the **Kvissel** measurement point
- KIM Eastern Headland 2
- KIM Eastern Headland 1, both with the **Hammelev** measurement point as the eastern headland, located approximately 140 kilometers south of Cape Skagen
- KIM Bend to the east, with the **Großenbrode Südstrand** measurement point

Since the coordinates are offset from one another, it appears that Eastern Headlands 1 and 2 are associated with Cape Skagen and represent the northern tip of the peninsula. This impression is misleading. The measurement point for **KIM Eastern Headland 1 and 2** refutes this and identifies Hammelev near Grenaa as the measurement point for the easternmost headland.

Measurement point: Wyk auf Föhr, Am Hafen

It stands to reason that the measurement point **Wyk on Föhr, Am Hafen** should be understood as the center of the **σαξόνων τρεῖς**, i.e., the **three Saxon islands**. The harbor was of supraregional importance; in addition to the **Saxon Islands** and the **first foreshore north of the Elbe estuary**, the measurement point is linked via distance intervals to **Ippon Basilikos 2** (Annaba, Algeria) and the **Tabuda estuary** (Zeebrugge).

Part IV Coordinates and measurement points between the Seine, Rhône, and Elbe

River systems

Sekoana, Arar, Dubis, Alpeon Reousai

Σηκοάνα πο[] εκ[], Σεκόνα ποτ[] εκ[]; άραρ, δοϋβις; άλπεων ρέουσαι
Sekoana, Sekona estuary; Arar, Dubis, Alpeon Reousai (Alpine streams)

Sekoana Endpunkte 1,2 :

Messpunkte

Balivaux pres de Vouglans (L'Ain)

Boux-sous-Salmaise, sur L'Oze

Bragny-sur-Saone

Chateau-Thierry, Av. de Paris

Dole, La Bedugue

Fontainebleau, Monts de Truies

Grimsensee Quellgebiet Aare, Übergang Rottental

Honfleur, Rue Notre Dame

Ladoye-sur-Seille, Seille Source

Les Rousses Uebergang L'Orbe zu La Bienne

Mainz, Grosse Langgasse

Messein, Camp d'Affrique 2

Saint-Martin-du-Frene, Rue Sous Chamoise 7 (Nasium)

Saint-Seine-L'Abbaye, passage terrestre entre la rivière L'Ougne et la source de la Seine

Seine, Source de la Seine

Viomenil, Source de la Saône

Sekoana Mündung 1,2 :

Messpunkte

Amiens, Boulevard des Fusilées

Arras, Espace Vauban

Boux-sous-Salmaise, sur L'Oze

Gravelines

Grimsensee Quellgebiet Aare, Übergang Rottental

Grugny, passage terrestre entre les rivières La Scie et Le Clérette

Honfleur, Rue Notre Dame

Kleve, Emmericher Strasse

Leerdam, Allg. Begraafplaats

Montreuil-sur-Mer, La Canche
Reims, Rue de la Salle
Saint-Omer, Allee des Marronniers
Seine, Source de la Seine
Tunis, Rue de Carthage
Villeneuve-Saint-Germain
Viomenil, Source de la Saône
Waringzelle Cran Barbier
Wisques

Sekoana Quelle:
Messpunkte
Ladoye-sur-Seille, Seille Source
Viomenil, Source de la Saône

Sekoana Mitte :
Messpunkte
Boux-sous-Salmaise, sur L'Oze
Grugny, passage terrestre entre les rivières La Scie et Le Clérette
Ladoye-sur-Seille, Seille Source
Saint-Seine-L'Abbaye, passage terrestre entre la rivière L'Ougne et la source de la Seine
Seine, Source de la Seine
Vermand, Chaussee de la Romaine

The coordinate descriptions contain six coordinates for the Sekoana River⁵⁹. Two are coordinates for the mouth of the Sekoana, one coordinate is given for the middle of the river, one coordinate for the source of the river, and two coordinates for the river's endpoints. The coordinate for the source of the river was interpolated; the measurement points confirm the coordinate data (see below).

It should be noted at the outset that the course of the Sekoana cannot be understood according to modern scientific principles, as the Sekoana River does not flow from a source to a mouth. The Sekoana comprises several rivers that are physically separate from one another.

The easternmost section of the river originates in the Swiss canton of Bern; this is the **headwaters of the Aare River**. The Aare flows into the Rhine. With the measurement points at the **Argentouaria** coordinates **Kembs-Schäferhof and Fessenheim – Rheininsel**, two stations can be identified where the route shifted from the Rhine to the Doubs / Arar. The transition between the Rhine and the Doubs is further marked by the **Lutran** measurement point, about one kilometer south of the present-day Rhine-Rhône Canal, near the village of Valdieu. The Doubs River can be reached via the Bourbeuse and Allaine / Allan rivers. The second source, calculated using the Sekoana coordinates, is that of the Saône. From the Saône, the transition to the Seine, the Oze, the Ozerain, and the Brenne is to be located southwest of the city of Dijon. The **Saint-Seine-L'Abbaye** measurement point would have marked one of the transition points. The third source is the physical source of the Seine, about 40 kilometers west

⁵⁹ STÜCKELBERGER / GRASSHOFF, Vol. 1: 205.

of the Saône at the level of the city of Dijon. A fourth calculated measurement point marks the source of the Seille, near the town **of Ladoye-sur-Seille**.

The easternmost and westernmost measurement points of the river system are connected by the Sekoana endpoint 2 coordinate. It links, on the one hand, to the Grimselsee measurement point (source of the Aare) with Greek distance interval 15 and, on the other hand, to the measurement point at the mouth of the Seine (Honfleur measurement point, Rue Notre Dame) with Greek distance interval 43.

The Sekoana coordinates represent a layer that has been inserted into an existing coordinate system. The coordinates and measurement points of the Arar and Dubis rivers, which are only partially preserved, belong to an earlier layer. Both have sources marked by measurement points in the Swiss canton of Obwalden, in the Alps south of Lake Lucerne. They drain via the Reuss River until it finally flows into the Aare, thus forming a transportation and communication network similar to that of the Sekoana. The connection to the Atlantic Ocean is missing.

Two additional sources, Arar and Dubis, originate from a single river source—the source of today’s Doubs—and are calculated using the Gallic distance interval. The upper course of the Doubs can thus be referred to as both Dubis and Arar, with Arar chronologically representing the older form.

At this point, we should also address the modern-day Reuss River. The coordinate descriptions mention the *Alpeon Reousai*, meaning the *streams from the Alps*, for this waterway. The earlier Greek name Reous is easily recognizable in the name of today’s Reuss.

Rodanos (Rhône)

Ροδανου ποταμου δυτικόν στόμα
Western mouth of the Rodanos

Measurement points
Algiers, Rue Hadj Omar
Cap Gris-Nez
Gravelines
Haltern am See, Weseler Strasse
Koblenz, Andernacher Strasse
Lausanne, Camping Vidy
Leerdam, General Cemetery
Lyon Confluence
Lyon Debourg
Maasdam Vogelbuurt
Nijmegen Papengas
Speyer, Grosse Gailergasse

Thunimont

Unlike with the Greek term Ekbol (Eng. *ejection*), the Rhône is not described by the physical direction of the water's flow, but rather by the access from the sea to the river—Ρόδανού ποτ[
Στομ[
(Greek: Στόμα, Stoma; Eng. *mouth* or *estuary* of a river). The mouth serves organically as an intake. What is meant here is the access from the sea into the Rodanos. The Rodanos is thus to be classified among the rivers described as parts of the human body, with a head, mouth, and arm.

Since the course of the Rhône essentially follows the depiction in the Narbonensis, the coordinates of the Rhône are not fully examined here. Links to measurement points to the north are available for the **coordinate of the Rhône's western mouth**. Via the Rhône, the rivers Meuse and Moselle, as well as the Rhine and subsequently the North Sea, were thus reached. The transportation axis extended from the western mouth of the Rhône further south to present-day Algiers in North Africa (**measurement point Algiers, Rue Hadj Omar**).

Ἡ δε προς Τον ροδανόν ποταμόν συμβολ Confluence of the Arar and the Rodanos (Rhône)

Measurement points

Bellefontaine, Source Bienne

Loing Embouchure dans la Seine

Lyon Confluence

Lyon Debourg

Toul, Rue des Lombards

Valserhône, Pont du Tram, traversée de la rivière La Valserine

The measurement point for the coordinate is **Lyon Confluence** in today's Jardin du Musée du Confluence. Additionally, the coordinate **Arar-Rhône confluence**, together with the **coordinate Lugdunum Metropolis**, is linked to the measurement point **Lyon Debourg**.

Το κατά την λίμ[ε]νην αὐτοῦ μέρος Την καλουμένην λιμένην Rodanos, port on Lake Geneva

Measurement points

Grimsel Lake, source of the Aare, crossing at Rottental

Lausanne, Camping Vidy

Lyon Confluence

The measurement point for this coordinate is located on the northern shore of Lake Geneva, near the modern city of Lausanne. Derived from the Greek Λιμέν (Limen), meaning *harbor*, the name indicates the location of a harbor or landing site.

From the mouth of the Seine River (Seine-Maritime department) in the south to Terneuzen (Zeeland province, NL) in the north

Froidios Pot .

Φροιδῖος ποτὺ εκβολαι, Φρούδιο ποτ εκβυλ
Froidios Potu. Ekbolai, Froudio Pot. Ekbul

Measurement points

Altenbergen, Lange Straße

Athies, Rue du Pavé

Camp des Belges 1, a une distance d'environ de 2,4 km du camp de Caesar, pres de Berry-au-Bac, avec Bellovacii, Tungri

Cap Gris-Nez

Grugny, passage terrestre entre les rivières La Scie et Le Clérette

Honfleur, Rue Notre Dame

Kleve, Emmericher Strasse

Loon-Plage, Rue du Moulin

Maissemy, Omignon

Mellum 2

Montreuil-sur-Mer, La Canche

Montreuil-sur-Mer, Rue Saint-Gengoult

Otzenhausen, Kahlenberg

Outreau, Rue d'Outreau

Pasly, Rue Jules Debordeaux

Ternoise - La Lawe Passage

Saint-Omer, Allee des Marronniers

Senne, Haustenbecker Straße

Soisson, Hôtel de Ville

Trier, Kaiserthermen

Waringzelle Cran Barbier

Westerschelde vor Cadzand

Wisques

Zeebrugge, New Yorklaan

The name **Froidios**, **Froudio** represents a *krasis*, i.e., the words have been contracted. Based on the measurement points in the region, it seems reasonable to interpret the name as **Πρῶν Ἰδῖος**, **Pron Idios**, the foreland of **Idi** or, more likely, **Iti**. The term *πρῶν ἀλῖος*, *Pron Alios*, meaning *foreland of Ionia*, is attested⁶⁰. A sound change from P to F, consistent with the pattern of the First Sound Shift, can also be observed in the coordinate designations elsewhere (cf. Fagaron / Feugaron and Tisoriakon, Gesoriak[on]).

⁶⁰ See LIDDELL / SCOTT on *πρῶν*.

A foreland is a coastal area, in this case the coastal area of **the Idi** or **Iti**. The meaning of a coastal area of **the Iti** is also found in **Ἰτίον ἄκρον 2**, Ition Akron 2.

Measurement point Feuqueries-en-Vimeu

Toponyms with a possible connection to the name **Froidios** are found only in the southernmost region of **the Iti**, at **the measurement point Feuqueries-en-Vimeu**. A connection between *Fro-*, *Frou-* and the place names Friville, Fresseneville, Feuquieres, Franleur, Vimeu, Friaucourt, and Fretteville around the measurement point is conceivable.

Measurement point Montreuil-sur-Mer on the Canche River

The measurement point **Montreuil-sur-Mer, La Canche**, located about 20 km from the coast on the Canche River, served as a trading hub for interregional commerce that may have existed as early as the pre-Roman period. This is inferred from connections across distance intervals with the coordinates **Froidios Estuary 1,2**, **Botamodouron 1**, **Gesoriakon 2**, **Londinium**, **Sekoana Estuary 2**, **Ition Akron 1**, and **Mosa Estuary**. The measurement point can also be understood—in addition to the mouth of the Liane River—as a second river mouth in the coastal region of **the Iti**.

The measurement point at **Montreuil-sur-Mer, Rue de l'Eglise**, south of the La Canche River, is associated with a Roman military operation. The coordinates **Bonna 2**, **Kaisaromago 2**, and **Augustodunum** are linked to the measurement point via distance intervals.

The Gallic counterpart in the military operation is likely indicated by the measurement point **Montreuil-sur-Mer, Rue Saint-Gengoult**. The coordinates **Atouakouton 1**, **Samarobrioua 2**, **Ratomagos 1**, and **Augusta Suessionum 2** are linked to this measurement point via distance intervals.

Measurement point Passage La Ternoise – La Lawe (Pas-de-Calais department)

The La Ternoise River is a tributary of the La Canche River, which flows past Montreuil-sur-Mer. Its source is near the village of Ostreville. The La Lawe River has its source near Magnicourt-en-Compte. The **Passage La Ternoise–La Lawe measurement point** is located between the two river sources, about three kilometers from each, and marks the transition from one river to the other. The Lawe River provides access to the inland areas further to the northeast.

Ition Akron 1,2

Τίονακρον, Ἰτίον ἄκρον

Tionakron, Ition Akron

Measurement point

Algier, Rue Hadj Omar

Altenbergen, Lange Straße

Beuzet l'Ourchet

Boué, Le Pavillon

Boulogne-sur-Mer, Plage

Cap Gris-Nez

Gravelines

Loon-Plage, Rue du Moulin

Mellum 1

Montreuil-sur-Mer, La Canche

Outreau, Rue d'Outreau (Boulogne-sur-Mer)

Ternoise - La Lawe Passage

Waringzelle, Cran Barbier

Messpunkt

Outreau, Rue d'Outreau

Outreau, Rue d'Outreau, is the measurement point for the coordinates **Froidios Potu. Ek 1,2** and **Ition Akron 1,2**. The measurement point is located on a hill not far from the Liane River. The association with four distance intervals assigned to **Iti** suggests that **Portus Itius**, a harbor used by Caesar for his military operations, was located nearby.

Measurement point

Boulogne-sur-Mer Beach

Based on the links with **Ition Akron 2**, **Kaisaromago 1,2**, **Gesoriakon 2**, **Ouetorra 2 Legio XXX Ulpia**, and **Ouegerra 1 Legio XXX Ulpia**, this is the **Portus Itius** used by Caesar, located on the beach at Boulogne-sur-Mer⁶¹. The two links with **Kaisaromago 1,2** refer to Caesar.

Measurement point

Cap Griz-Nez and Waringzelle Cran Barbier

The **Waringzelle Cran Barbier** measurement point has been calculated almost entirely using coordinates from Ptol 1, while the **Cap Griz-Nez measurement point** uses coordinates from Ptol 2. The distance between them is approximately 1.2 kilometers. The **Waringzelle Cran**

⁶¹ BG 5.2; 5.5

Barbier measurement point is located approximately 100 meters off the coastlin ; at the time the measurement point was recorded, the coastline must have extended further west.

The **Cran Barbier measurement point** is presumably the older one. In addition to **Ition Akron 1**, the connections include the **Froidos estuaries 1 and 2**, **Gesoriakon 1** (i.e., Τισορίακον επίνειον Ρομομηρ), **the Sekoana estuary 1**, and **the Tabuda estuary**.

The **Cap Gris-Nez measurement point** is linked to **Ition Akron 2**, as well as **the western mouth of the Renos, Karchedon, the Froidios estuary 2**, and **Gesoriakon 2**; it is thus integrated into transregional trade routes. Cap Gris-Nez is a prominent navigational landmark and, at the same time, a vantage point that today houses a lighthouse for maritime navigation.

Another settlement area of the Iti

Another settlement area of the Iti was located in the region of present-day Altenbergen in the district of Höxter (coordinate Μουνιτιον Μουνίτιον, Mounition) and may have extended from there into the Senne region, northeast of Bad Lippspringe.

Iti is included as part of the designation in approximately 100 coordinates (Stückelberger/Graßhoff) and is found much more frequently in Africa and Asia.

Tisoriakon, Gesoriak [on]

Τισορίακον επίνειον Ρομομηρ, Γεσορίακ εψίνιον
Tisoriakon Epineion, Gesoriak[on] Efinion

Measurement points

Boué, Le Pavillon

Boulogne-sur-Mer, Beach

Cap Gris-Nez

Gravelines

Loon-Plage, Rue du Moulin

Montreuil-sur-Mer, La Canche

Outreau, Rue d'Outreau

Saint-Omer, Avenue des Marronniers

Ternoise - La Lawe Passage

Waringzelle Cran Barbier

Wisques

Zeebrugge, New Yorklaan

The **coordinates Tisoriakon 1 and Gesoriakon 2** refer to several measurement points for ship landing sites from Outreau in the south to Zeebrugge in the north. For Outreau, Boulogne-sur-Mer, Waringzelle, and Cap Gris-Nez, see under **Ition Akron**.

Measurement point

Gravelines

To the north lies a landing site west of the town of Gravelines, about 3,5 kilometers south of the present-day coastline. The landing site likely played an important role between the mouths of the Seine to the south and the Rhine to the north, as indicated by the links to the **coordinates Sekoana Mouth 2, Renos Western Mouth and Tabuda Mouth**. The landing site may have been used by the Suessones in pre-Roman times. Caesar reports that a king of the Suessones ruled over Britain⁶². In this context, the link to the coordinate **Augousta Ouessonon 1** could be considered.

It is unlikely that there was more than a landing site at this measurement point, since Τισορίακον, Tisoriakon, contains θις-, *Tis-*, or even θιν-, *Tin-*, meaning a sandbank or a sandy beach, and thus not a fortified harbor⁶³. The landing site was also used by the Roman fleet, as indicated by the association with the coordinate **Ouegerra 1 Legio XXX Ulpia**, as well as the addition to Tisoriakon 1, ἐπίνειον Ρομομηρ, meaning *harbor or Roman naval base*.

Measurement point

Loon-Plage, Rue du Moulin

Nine kilometers east of the landing site near Gravelines is another landing site near the town of Loon-Plage, a little over three kilometers from today's coastline.

The landing site served long-distance trade. To the north, the measurement point connects with the coordinates **Tatorion 2, Louppia**, and **Mesuion 1,2** to measurement points in present-day northern Germany. In North Africa, it connects with the coordinates **Ikosion and Kastrā German 1**. The landing site was thus a station for long-distance trade.

Regionally, the measurement point is also well connected; it links with the coordinate **Samarobrioua 2**, possibly Saint-Omer, and two **coordinates of the Iti, Froidios Estuary 1 and Ition Akron 2**.

Tabouda Estuary

Ταβούδα ποτὺς ἐκβολ, Ταβούλα ποτ[] ἐκ
Tabouda, Taboula river mouth

Measurement points

Ilmenau-Luhe-Zusammenfluss

Lauenburg, Amtsplatz

Montreuil-sur-Mer, Rue de l'Eglise

Muenster Hauptbahnhof

⁶² BG 2:4

⁶³ LIDDELL: 708.

Terneuzen, Buitenhaven
Waringzelle Cran Barbier
Westerschelde vor Cadzand
Wyk auf Föhr, Am Hafen
Zeebrugge, New Yorklaan

Two measurement points are suitable for localization: the **Zeebrugge New Yorklaan** measurement point at the mouth of the Reie River where it flows into the North Sea, and the mouth of the Scheldt River at the **Westerschelde** measurement point off the coast of Cadzand.

Furthermore, the coordinate refers to other measurement points associated with rivers and tides on the North Sea, namely the measurement points **Lauenburg Amtsplatz** (Elbe River), **Wyk auf Föhr** (now North Sea), and likely also **Montreuil-sur-Mer, Rue de l'Eglise** (Canche River).

A name derived from the semantic field of water, river, or sea is to be expected. Cod. Vat. Gr. 191 lists Taboula as a name variant, which, in a Celtic language variant with *Ta-* *-la* meaning “to swell, to expand,” would be interpreted as “expanding water.” Given the location of the measurement points, this is a plausible interpretation; however, the meaning of *-bou-* remains unclear, as does the variant *-da* from Cod. Vat. Gr. 177.

Tarouanna

Ταρουάννας, ταρούαννα
Tarouanna

Measurement points
Beuzet l'Ourchet
Terneuzen, Buitenhaven
Westerschelde off Cadzand
Zeebrugge, New Yorklaan

The ancient coordinate likely refers to present-day Terneuzen; the measurement point is located near the city **on the modern Terneuzen–Ghent Canal**. The coordinate also corresponds to the mouth of the Scheldt in the modern Westerschelde.

From Amiens (Somme department) in the south to Saint-Omer (Pas-de-Calais department) and Namur (Wallonia province, BE) in the north

Origiakon

Οριγῖακον Μέτακον Ἄτωσ ἀκρον και πόλις
Origiakon Metakon Atos Akron and Polis

Measurement points

Athies-sur-l'Omignon, Rue du Pavé
Amiens, Boulevard des Fusillées
Arras, Espace Vauban

The name Origiakon likely refers to the modern-day river l'Omignon; this is suggested by the **measurement point in Athies sur l'Omignon, Rue du Pavé**. The measurement point is located near the riverbank and not far from where the river flows into the Somme.

The measurement points in the departments of Somme and Pas-de-Calais are, in addition to **Athies sur l'Omignon, Rue du Pavé; Arras, Espace Vauban; and Amiens, Boulevard des Fusillées**. The measurement points in Arras and Amiens are linked to the **coordinate Mount Athos and city** (today on the Greek peninsula of Chalkidiki) with Greek distance intervals. This is to be understood as indicating that these were the same peoples. A place name for Mount Athos is already found in the Iliad.⁶⁴

For Athies, the names *Atteiae* (6th century), *Attheyae* (10th century), and *Atheias* (1100) are attested⁶⁵. For Athies, a formation from a place prefix *a-* and *-ti* ('towards something') and *place* is conceivable. The meaning of *a* corresponds to *à* in modern French. The designation *a-ti* may originally have referred to other places near Amiens and Arras; in the latter, there is also a place named Athies.

The data for the **Amiens** measurement point, **Boulevard des Fusillées**, demonstrate an extremely high and rarely seen level of accuracy, with a deviation of only approximately 3 meters across five coordinates, each of which has three decimal places. This allows the linkage with the **Sequana Estuary 1** coordinate, with a distance interval of 7,0033, to be classified as a later insertion. The four decimal places indicate a calculation layer added later.

The rudimentary designation *-ti*, meaning *place*, without any further addition, also supports an early dating. The associated Mount Athos on the Chalkidiki is also mentioned by Homer as early as the Iliad, indicating that the name existed from an early period.

⁶⁴ Homer, Iliad 14:226–228

⁶⁵ GRANIER, M.J., Dictionnaire topographique du département de la Somme, Paris and Amiens 1867:48.

The course of the Omignon River must have been significant in antiquity, as it is described using three measurement points in Gallic distance intervals. In addition to the measurement point in **Athies**, there are also measurement points for **the Origiakon coordinate** near **Vermand**, **Chaussee de la Romaine**, and near **Maissemy**. This indicates that the Omignon River corresponds to the ancient Origiakon coordinate. The fertility of the land along the Omignon River suggests that the coordinate designation should be read as the Greek Ωρικός (orikos), meaning *blooming*, and understood as a description of a fertile, flourishing landscape.

Kaisaromagos

Καίσαρόναγος, Καίσαρόμαγο
Kaisaromagos, Kaisaromago

Measurement points

Amiens, Boulevard des Fusilées

Arras, Espace Vauban

Athies, Rue du Pavé

Avenches, Chem. des Conches

Barbelroth, Horbach

Bavay, Chemin Delmaire

Berry-au-Bac, Rue du Moulin

Besançon Palais Granvelle

Boulogne-sur-Mer, Plage

Bourogne, Rue de Belfort

Cambrai, Place du 9 Octobre

Camp des Belges 1, a une distance d'environ de 2,4 km du camp de Caesar, pres de Berry-au-Bac, avec Bellovacii, Tungri

Esch-sur-Alzette Rue de Belvaux

Genf, Rue de Beaulieu 1

Genf, Rue de la Croix Rouge

Grand, Place de la Fontaine

Grugny, passage terrestre entre les rivières La Scie et Le Clérette

Loon-Plage, Rue du Moulin

Mainz, Grosse Langgasse

Montreuil-sur-Mer, Rue de l'Eglise

Naix-aux-Forges

Paris, Pont Royal

Pasly, Rue Jules Debordeaux

Ternoise - La Lawe Passage

Reims, Rue de la Salle

Solesmes 1, sur la Selle

Solesmes 2, Impasse des Quatre Amants

Soisson, Hôtel de Ville

Strasbourg, Quai Jacques Sturm

Vermand, Chausee de la Romaine
Villeneuve-Saint-Germain Aisne
Villers-Cotterets / Longpont
Wisques

The **Kaisaromagos 1,2** coordinates were used to depict Caesar's military operations during the Gallic War. The Greek distance intervals refer to Roman locations. Among others, the Roman locations at the Battle of the Axona and the Sabis are depicted (see under Geography in the Service of Military Commanders). Caesar's port is also depicted using the **Boulogne-sur-Mer Plage** measurement point, as indicated by the coordinates linked to Boulogne-sur-Mer.

It is unlikely that the city of Cambrai can be identified with an ancient polis named Kaisaromagos. For Cambrai, the name Camaracum is attested for the period around 300, with copies from the 8th and 10th centuries⁶⁶. The Dutch name is Kamerijk. Given the links between the **Cambrai measurement point, Place du 9 Octobre**, and the **coordinate Karchedon**, it is also possible to interpret the initial sound *Ca-* or *Ka-* historically as a term for *a boat* (see also under Kastellon).

Samarobrioua

Σαμαροβρίουα, Σαμαροβρίγα
Samarobrioua, Samarobriga

Measurement points
Algiers, Rue Hadj Omar
Amiens, Boulevard des Fusilées
Arras, Espace Vauban
Athies, Rue du Pavé
Montreuil-sur-Mer, Rue Saint-Gengoult
Passage Ternoise - La Lawe
Cambrai, Place du 9 Octobre
Bavay, Delmaire Road
Boué, Le Pavillon
Château-Thierry, Rue de la Barre
Saint-Omer, Avenue des Marronniers
Calais, General de Gaulle Boulevard
Loon-Plage, Rue du Moulin
Kassel, Hafenstrasse
Riepe near Ihlow
Uphusen, Zum Uphuser Meer

⁶⁶ GYSSELING, MAURITS, *Toponymisch Woordenboek van België, Nederland, Luxemburg, Noord-Frankrijk, West-Duitsland, Deel 1*, 1960: 214.

The measurement points for **Samarobrioua, Samarobriga 1,2** cover a wide geographical area, from Algiers in Algeria to Uphusen in Lower Saxony (Germany). These were likely originally a collection of points along rivers and near the sea that were relevant to navigation.

The name of the coordinate provides a clue to this. I prefer the variant from Cod. Vat. Gre. 177 with *-obrioua* (cf. the coordinate Obrioua), meaning German *by the river*, French *sur la rivière*, English *on the river*. The word element *Samar-* is not found in any of the other up to 10,500 coordinates; it does not appear to be a geographical term. For Σαμα, a Doric variety of the Greek Σημα, Sima, meaning *sign or mark*, is a possibility (cf. German *Zeichen*, Latin *signum*, English *sign*, French *signe*). The meaning for the coordinate designation is therefore *mark or sign on the river*. Nothing is said about the nature of the mark, but the measurement points suggest a function related to navigation.

In the Commentaries on the Gallic War, Caesar (5.24.1) mentions a place called Samarobriga, to which he invited for a gathering. This may be the location where such a record of landing points and harbors was kept. Modern-day Amiens has often been identified as the Samarobriga mentioned by Caesar. However, the distance intervals highlight two other locations by linking them respectively to **Samarobrioua 1 and 2**. These are **Saint-Omer** and **Bavay**, which are preferable for locating the place named Samarobriga by Caesar.

Baganon, Basakon

Βαγανον, βασακον, Μερούσιοι, [Ε]ρούσιοι
Baganon, Basakon, Merousioi, [E]rousioi

Measurement points

Aachen, Pontstrasse

Athies, Rue du Pavé

Bavay, Chemin Delmaire

Beuzet l'Ourchet

Buchten Dorpstraat

Camp des Belges 3, a une distance d'environ de 5,5 km du camp de Caesar, pres de Berry-au-Bac, avec Ambianii, Nervii, Suessionii, Viromanduii

Herten, Prinsensteerten; Einmündung der Rur in die Maas

Krefeld-Cracau, Schubertstrasse

Roer Quelle

Solesmes 2, Impasse des Quatre Amants

Trier, Kaiserthermen

Villeneuve-Saint-Germain

The territory of the people, whom Caesar refers to as the Nervii in The Gallic War, extends from Bavay in the southwest to north of the city of Namur in Wallonia (BE). **The central measurement points are Bavay, Chemin Delmaire, and Beuzet, l'Ourchet.** The site near the small village of Beuzet on the l'Ourchet River was likely a rural settlement area; the

measurement point at is located in the l'Ourchet river valley. Bavay was a possible settlement site under Roman rule. The measurement point in Bavay lies slightly north of the current built-up area.

The name of the polis is Baganon or Basakon; its etymology is unclear, as is its linguistic classification. Caesar refers to the people as the Nervii; in Cod. Vat. Gr. 177, Merousioi is cited as the name of the ethnos.

The Nervii were involved in the Battle of the Axona and the Battle of the Sambre, as the other measurement points indicate. They share the **Buchten Dorpstraat** measurement point with the Batavi and the Treveri; it may be connected to the so-called Batavian Revolt in the years 68 and 69 AD.

In the area of Soissons (Dép Aisne) and Reims (Dép Marne)

Augousta Ouessonon

Ἀυγούστα ουεσσόνων, Αὐγούστα Οὐεαγον
Augousta Ouessonon, Augousta Oueagon

Measurement points

Bodman, Altbodman

Camp des Belges 3, approximately 5.5 km from Caesar's camp, near Berry-au-Bac, with the Ambianii, Nervii, Suessionii, and Viromanduii

Maissemy, Omignon

Metz, Rue du Pont Saily

Montreuil-sur-Mer, Rue Saint-Gengoult

Naix-aux-Forges

Paris, Pont Royal

Pasly, Jules Debordeaux Street

Ternoise - La Lawe Passage

Seine, Source of the Seine

Villeneuve-Saint-Germain

Villers-Cotterêts / Longpont

According to Ptolemy 1,2 the name of the ethnic group is ουεσσονες (Ouessones) or ούεαγονες (Oueagones). Caesar refers to them as the Suessiones. The Suessiones fought alongside the Belgae in the Battle of the Axona River. After the Belgae's defeat, Caesar conquered a Suessiones town named Noviodunum.

Traditionally, it is assumed that the name of the French city of Soissons derives from the ethnic name of the Suessiones. However, based on the coordinates, the Suessiones were not involved in the founding of the Roman city of Soissons. The measurement point **Soissons, Hôtel de Ville**, is linked via a **Greek distance interval** to **Kaisaromagos 1** and is thus identified as a Roman urban settlement. Those involved in the founding include the Atrebates (linked to **Origiakon**), the Tungri (linked to **Atouakoukton 2**), and the Iti (linked to **the Froidios estuary 2**)—a people not mentioned by Caesar—but not the Suessiones. It is conceivable that the settlement at Soissons was initially planned as a counterweight to the Suessiones, since two settlements attributed to the Suessiones are located in the immediate vicinity of Soissons.

An oppidum was located east of Soissons, between the present-day town of Villeneuve-Saint-Germain and the Aisne River⁶⁷. The coordinates indicate that military battles took place around this oppidum. On the Belgic side, the oppidum was occupied by the Suessiones (Gallic link to **Aug. Ouessones 1**), the Nervii (Gallic link to **Baganon**), and the Subanects (Gallic link to **Ratomagos 1**). On the Roman side, however, the Remi fought alongside them (linked to the coordinate **Dourokottoron**; see **Geography in the Service of the Military Commanders** for more on this).

West of Soissons lies an elevated site near the village of Pommiers; the corresponding measurement point is located in the village **of Pasly**, east of the ridge. The site can be attributed to the Suessiones, as the **Pasly** measurement point is linked to **Aug. Ouessonon 1,2**. The use of Greek distance intervals and the link to **Kaisaromagos 2** indicate that a Suessiones settlement is described here as a Roman site. In addition to the Suessiones, the following were involved in the site: the Iti (linked to **Froidios Mouth 1**) and the Oiromandues (linked to **Oiromanduagon**).

The sequence thus appears to be that, following the military conflict over the oppidum near Villeneuve-Saint-Germain—which the Suessiones lost—the new Roman settlement at the site of present-day Soissons was initially ceded to other Belgian peoples. For the Suessiones, the oppidum remained on the ridge between Pommiers and Pasly.

Another Suessiones settlement must have been located in a wooded area between the towns **of Villers-Cotterêts** and **Longpont**, about 16 kilometers southwest of the modern-day city of Soissons. The site is situated in the headwaters of several streams.

Dourokottoron

Δουροκόττορον, Δουροκόττορον
Dourokottoron

Measurement points
Alexandria, Cape Lochias
Chateau-Thierry, Rue de la Barre
Dole, La Bedugue
Fontainebleau, Monts de Truies
Fritzlar, Rosenturm
Glauberg bei Glauburg
Hymont, Rue de Solenval
Köln, St. Aposteln
Reims, Rue de la Salle

⁶⁷ See ROBERT, BRUNO, Villeneuve-Saint-Germain – Le Porcherai (archaeological entry), ADLFI. Archaeology of France - Information [Online], Hauts-de-France, published online on March 1, 2006, accessed on August 10, 2025. URL: <http://journals.openedition.org/adlfi/4292>; DOI: <https://doi.org/10.4000>

Rubenheim
Villeneuve-Saint-Germain Aisne
Villers-Cotterets / Longpont

The measurement points for the coordinate **Dourokottoron** indicate the supraregional significance of the location of the Remi ethnic group. The linked measurement point **Alexandria, Cape Lochias**, points to a center of the ancient world. The measurement points **Fontainebleau**, **Monts de Truies**, **Fritzlar Rosenturm**, **Glauberg bei Glauburg**, **Köln Sankt Aposteln**, and **Rubenheim** point to locations that likely held special significance as seats of power or due to their sacred importance.

Given the significance of Dourokottoron within the coordinate system and its connections to extraordinary places, the question arises as to why the site was significant. A fragment of a text by Fronto from Roman times provides a clue.

“In a fragment of an oration by Fronto (C. Fronto’s Reliquiae, ed. Niebuhr, p. 271) there are the words ‘et illae vestrae Athenae Durocorthoro,’ from which it is inferred that there was a school at Durocortorum, where rhetoric, a favorite study of the Gauls, was cultivated.”^{68 69}

It is worth examining the etymology of Dourokottoron. For the first element, *Dour-* or *Dur-*, the Greek Τύρα (tura), meaning *door*, can be considered. In *Dour-*, the Greek T has changed to D. The Gallic *doratia* and *duron* also contain *dor-* / *dur-* with the meaning of *door*⁷⁰. For *-kot-* or *-kort-*, a derivation from the Greek Κόρτος, kortos, meaning *a boy*, is possible.

The interpretation of this is a door through which boys pass to become adults, i.e., a place of education. Caesar mentions in his Commentarii on the Gallic War that some boys remain in a student-teacher relationship for 20 years.⁷¹

An explanation derived from Greek makes sense not only linguistically. The correlation of the coordinates evaluated so far also reveals connections from Gaul to Greece. Thus, we see the Lakoi people, who live along the upper reaches of the Meuse and Moselle rivers. The Spartans on the Peloponnese also belong to the Lakoi people.

The local measurement points for Dourokottoron are **Reims Rue de la Salle**, **Chateau-Thierry Rue de la Barre**, **Villeneuve-Saint-Germain Aisne**, **Villers-Cotterets / Longpont**

The Reims Rue de la Salle, measurement point links to the **Kaisaromagos 1** coordinate with the Greek distance interval 9 and indicates the founding of a significant settlement by the Remans at this location under Caesar. The measurement point **Chateau-Thierry, Rue de la Barre**, is significant due to its placement in the coordinate system, as it links not only to **Dourokottoron** and the point **0 lon 90 lat** of the coordinate system but also to the coordinates

⁶⁸ NIEBUHR, B.G., M. Cornelii Frontonis Reliquiae, Berlin 1816: 271.

⁶⁹ SMITH, WILLIAM (Ed.) Dictionary of Greek and Roman Geography, Vol. I, Boston 1870: 794.

⁷⁰ DELAMARRE: 147,156.

⁷¹ CAESAR, GAIUS IULIUS, De bello Gallico, 6,14,3, übersetzt und kommentiert von Marieluise Deißmann, Reclams Universal-Bibliothek Nr. 14372, Stuttgart 2023: 369.

Alexandreia, Ikosion, Karchedon, and Samarobrioua 2. The measurement points **Villeneuve-Saint-Germain Aisne** and **Villers-Cotterets / Longpont** are related to the Suessiones and are explained there.

Was Chateau-Thierry a training center for learning how to calculate distances, enabling long-distance voyages—an astronavigation school? This would explain the significance of Dourokottoron in the coordinate system. The coordinates uncovered so far demonstrate the importance this measurement point held. The **Château-Thierry Rue de la Barre** measurement point is linked to **point 0 longitude, 90 latitude** of the coordinate system on the west coast of Greenland with a distance interval of **201 in Gallic units**, i.e., the distance is $201 \times 16,83$ kilometers. The value 201 is certainly no coincidence but was chosen deliberately due to its numerological significance.

Measurement point Château-Thierry, Avenue de Paris

Château-Thierry, Avenue de Paris

Measurement points

Amoeneburg, Stiftskirche - gallic 26,333

Breisach, Josef-Bueb-Strasse (Urakokmagos, Brakomagos) - greek 24,5

Cambrai, Place du 9 Octobre - gallic 7,5

Eichstaett, Diözesanarchiv (Alkimoennis) - greek 42,416

Otzenhausen, Kahlenberg (Augousta Tribir) - gallic 16,05

Pfarrkirchen, Gartlberg (Boiodouron) - gallic 42

Traben, Rieslingstrasse - gallic 17,2083

Ulrichsecke und Hattenberg beim Ort Niederaula an der Fulda - greek 36,033

The **Château-Thierry Avenue de Paris** measurement point is linked to **eight settlements**, whose distances from the measurement point are measured in Greek or Gallic distance intervals. When these seven settlements were constructed, care must have been taken to ensure a precise distance—accurate to within a few meters—from **Château-Thierry Avenue de Paris**.

The settlements are also linked to one another using Greek or Gallic distance intervals; for example, the **measurement point** at **Pfarrkirchen Gartlberg (Boiodouron)** is linked to

- **Amoeneburg Stiftskirche - greek 29,0166**
- **Eichstaett Diözesanarchiv – gallic 8,2**
- **Otzenhausen Kahlenberg – greek 33,7083**
- **Ulrichsecke und Hattenberg beim Ort Niederaula an der Fulda – greek 26,5**

The precise pairing with distance intervals presupposes that maintaining a certain distance from other sites was already a decisive factor in the selection of the location.

From the sources of the Meuse (Dép. Haute-Marne) and Moselle (Dép. Vosges) to Verdun-sur-Meuse (Dép. Meuse) and Ruwer an der Ruwer (BL Rheinland-Pfalz)

Measurement points: Sources of the Meuse and Moselle rivers

The measurement points for both sources are defined by distance intervals of the three **coordinates: Mosa estuary, Augousta Tribir 1, and Augusta Triber 2**. The source of the Meuse is calculated using Greek distance intervals, the source of the Moselle using Gallic distance intervals. For both sources, the same mouth, the mouth of the Mosa (Meuse), is calculated. The upper course of the Moselle, from the source to Toul, is to be understood as part of the Meuse. The route likely led westward from the Moselle to the Meuse starting from Toul.

The Lakoi / Leuki on the Upper Meuse and Moselle

The Leuki people, referred to as Lakoi in the coordinate descriptions, settled in the regions of the Upper Moselle. According to the coordinate descriptions, their cities were Toullon and Nasion. Toullon has been preserved in the city name Toul (Dép. Meurthe-et-Moselle).

The measurement points at coordinates **Toullon 1,2** confirm the Lakoi settlement area along the Upper Moselle, along with the measurement points **at Toul Rue de la Petite Boucherie, Messein Camp d’Affrique 1,2, and Hymont Rue de Solenval**, (on the River Saule, which flows into the River Madon, which in turn flows into the Moselle). Beyond the Upper Moselle region, the measurement points indicate that the transitions between the Moselle–Rhine system on the one hand and the Doubs–Rhône river system on the other hand must also be attributed to the Lakoi. This is demonstrated by the measurement points **Thunimont** and **Le Tolloy**, which are located on the boundary between the river systems.

As with the **coordinate Origiakon**, the **coordinates Toullon 1, 2** and the measurement points have connections to Greece, specifically to Sparta. The coordinate **Laktron 2** is linked to the measurement point Sparta Acropolis on the Peloponnese, while **Laktron 1** is linked to the measurement points **Toul Rue des Lombards, Thunimont, and Messein Camp d’Affrique 1**. The **coordinate Toullon 1**, for its part, is linked via distance intervals to the measurement point **Sparta Acropolis**. In summary, this indicates that **the Spartans** and **the Lakoi** are identified as related ethnic groups.

The Boii, with their polis **Boiodouron** in the Ouindelikon, must be included in this context. **Boiodouron** is linked via a distance interval to the measurement point **Thunimont**, and the coordinate **Toullon 1** is linked to the measurement point **Pfarrkirchen Gartlberg** in Lower Bavaria (D), which is the measurement point for Boiodouron (polis of the Boii).

The measurement point **Gauaschach Sebastiansstrasse** in Lower Franconia (Unterfranken, D) must also be included, which is calculated from the coordinates **Laktron 2** and **Toullon 1**. The coordinate **Gravionarion**, in turn, links to the measurement point **Thunimont**. This demonstrates the geographically distant kinship of ancient ethnic groups.

Toullon

Τουλλον, τούλλιον, λάκτρομ
Toullon, Toullion, Laktron

Measurement points

Avenches, Chem. des Conches
Belvedere de Mandeure (Mandeure)
Chalon-sur-Saone, Gué de La Benne-La-Faux
Dole, Av. Aristide Briand
Gauaschach Sebastiansstrasse
Genf, Rue de Beaulieu 1
Grand, Place de la Fontaine
Hymont, Rue de Solenval
Messein, Camp d'Afrique 1
Messein, Camp d'Afrique 2
Montbeliard, Gare
Naix-aux-Forges
Pfarrkirchen, Gartlberg
Rhone Gletscher
Sparta, ant. Akropolis
Thunimont
Tolloy, Le
Toul, Rue des Lombards
Traben-Trarbach Marktplatz

The measurement points associated with this coordinate are located near the village of **Thunimont** on a river that was still called the Tolloire in the 19th century, and near **the hamlet of Le Tolloy**, with a stream of the same name, a tributary of the Tolloire. Thunimont, with various spellings: Tunymont in 1582, Thunymont in 1621, Tignimont in 1656. The stream formed the border between Lorraine and Burgundy in 1640⁷². At the confluence of the former Tolloire (today Ruisseaux des Caillaux) with the Le Coney (today Canal des Voges), the transition between the river systems of the Saône and the Moselle begins to the northeast, and further on between the drainage via the Rhône into the Mediterranean Sea and via the Rhine into the North Sea.

⁷² Topographical Dictionary of the Vosges Department: Including Ancient and Modern Place Names; compiled by Paul Marichal. Paris, 1941: 422, 423.

The significance of Toullon / Toullion as a transition between two river systems is supported by the name. The name Toullon / Toullion represents a krasis of the Germanic *tou-* / *to-* meaning *toward something* and the Greek ἄλλος, *allos*, meaning *other, others* and *toward the other*.

The measurement point **Dole, Av. Aristide Briand**, is linked to **Toullon 1** via the Greek distance interval 7. The name Dole can therefore be associated with **Toullon**. The **Toul measurement point, Rue des Lombards**, is linked to the **coordinate Toullon 1** via a distance interval, while the **Toul measurement point, Rue de la Petite Boucherie**, is linked to the **coordinate Laktron 1**. The name Toul derives from **Toullon**.

Measurement point Grand (Dép. Vosges)

The calculation of the measurement points provides a clear picture. The measurement point is located at Place de la Fontaine. Two distance intervals are linked to the **coordinates Toullion 2 and Nasion**, thus assigning Grand to the Lakoi ethnos. Two additional distance intervals are linked to the **coordinates Kaisaromagos 2 and Augustodunon**, thereby identifying Grand as a settlement founded under Roman rule.

Nasion

Νάσιον Νάσιον
Nasion

Measurement points
Bellefontaine, Source Bienne
Esch-sur-Alzette Rue de Belvaux
Grand, Place de la Fontaine
Hymont, Rue de Solenval
Lutran. 1 km a l'est de la ville Lutran, entre les systèmes fluviaux du Rhône et du Rhin
Lux, Port Guillot
Naix-aux-Forges
Saint-Martin-du-Frene, Rue Sous Chamoise 7

The **Lutran measurement point** marks the watershed between the drainage into the North Sea and the drainage into the Mediterranean Sea. It is located about one kilometer south of the present-day Rhône-Rhine Canal, between the La Suareine River, which drains into the Mediterranean via other rivers, and the La Lague River, which drains into the North Sea via the L'Ille and the Rhine. The coordinates suggest that this was also a territorial boundary. According to the coordinates, the area further south is assigned to the Sequanii (**distance intervals Auantikion and Ouisountion**), while the area to the north belongs to the Lakoi (**distance interval from Nasion**).

Measurement points: Hymont, Rue de Solenval, and Saint-Martin-du-Frène, Rue sous Chamoise 7

The **measurement point** in the village of **Hymont** can be etymologically linked to nearby place names. The distance interval from the **Nasion coordinate** to the **Hymont measurement point** is 13 in Greek (), which points to the significance of the location. Place names in the immediate vicinity include Mattaincourt, Maroncourt, Madecourt, and other places beginning with “M-”. A derivation from an initial sound of *Na-* / *Ma-* is plausible. The measurement point **Saint-Martin-du-Frène, Rue sous Chamoise 7**, is also a possible location.

Diouodouron

Διουόδουρον διουόδουρον, μεδιοματρικες
Diouodouron, Mediomatrikes

Measurement points
Bourogne, Rue de Belfort
Chalon-sur-Saône, Gué de La Benne-La-Faux
Dole, Av. Aristide Briand
Doubs Source 2
Lux, Port Guillot
Metz, Rue du Pont Saily
Toul, Rue des Lombards

The **measurement point** associated with the name of the ethnic group of the Mediomatrikes is located on **Rue du Pont Saily in Metz**. The distance is calculated using a half-interval from the **coordinate Augousta Ouessonon / Augousta Oueagon 2**, and using full intervals from the **coordinates Diouodouron, Oiromanduagon, and Augusta Tribir**.

Roufiana

Ρουφιάννα, Ρουφίνιαννα
Roufiana, Roufiniana

Measurement points
Lohr am Main, Kapuzinergasse
Rubenheim an der Blies
Ruwer, Ruwermundung
Sarre Rouge, Source
Sarreguemines, dt. Saargemünd, Einmuendung der Blies

Speyer, Grosse Gailergasse
Speyer, Oelhafen
Strasbourg, Chemin de Gliesberg, Embouchure de la Bruche

The coordinates are associated with the town **of Ruwer at the confluence of the Ruwer River** and the Saar River, with **Rubenheim an der Blies, Sarreguemines (German: Saargemünd)** at the confluence of the Blies and the Saar Rivers, and with the **headwaters of the Rote Saar**.

It is reasonable to interpret Roufiana as referring to the confluence of one river with another. The composition consists of Pou-, Rou-, meaning *river*, as a variant of Ra-, and φια -fia- or φιαν -fian-, Latin *finio, finis*, meaning *boundary*, related to the Greek πια, meaning *tip*. Roufiana can thus be interpreted as a river *boundary* or, more clearly, as a *river mouth*. The place name Ruwer derives from the term for *river mouth*.

The place name Sarreguemines, German Saargemünd, is also based on the meaning of a river's confluence with the Saar. Historical references: *Gaimunda (706)*, *Gamundias (706)*⁷³. The suffix -mund- is likely to mean *mouth* or *confluence*.

Augousta Tribir

Αυγουστα τριβιρ, Αυγουστα τριβερ
Augousta Tribir, Augusta Triber

Measurement points
Aachen, Pontstrasse
Barbelroth, Horbach
Belvedere de Mandeuere (Mandeuere)
Berry-au-Bac, Rue du Moulin
Bodman, Altbodman
Bonn, Colmantstrasse
Breisach, Josef-Bueb-Strasse
Buchten Dorpstraat
Euskirchen, Euro-Park
Heidelberg, auf dem Heiligenberg
Mainz, Grosse Langgasse
Messein, Camp d'Afrique 2
Metz, Rue du Pont Saily
Otzenhausen, Kahlenberg
Sarre Rouge, Source
Sarreguemines, Einmuendung der Blies
Meuse, Source de la Meuse (Maas)
Moselle, Source de la Moselle (Mosel)
Strasbourg, Chemin de Gliesberg, Embouchure de la Bruche

⁷³ DE BOUTEILLER, Dictionnaire Topographique de l'Ancien Département de la Moselle, Paris 1874: 238.

Tolloy, Le
Trier, Kaiserthermen
Vesoul, La Motte
Weiherkopf und Passhöhe

The sources from Cod. Vat. Gr. 177 and 191 give the ethnic name as Tribiroi and the place name as Tribir or Triber. The Latin variant of the ethnic name, *Trever*, is not found here. The prefix *Tri-* with a reference to the number *three* occurs in various contexts and is not unusual. In Homeric usage, *θρι-* is understood as sacred, as is *θρίνακρία*, an ancient name for Sicily, derived from *θρίναξ*, Poseidon's sacred trident (English: Trident)⁷⁴. The meaning is also preserved in *triumph* and *trinity*.

The meaning of *-bi-r* is unclear. A *-bi-* functioning as a suffix with the meaning *where* cannot be ruled out. This variant is supported by the reading *Tribir* as *the* Latin *Trever* with *-ve-* instead of *-bi-*. The meaning would then be *where the sacred place is*.

The **Trier Kaiserthermen** measurement point is linked to the **coordinates Karchedon, Froidios Mündung 2, Baganon, and Atouakouton 2**. The measurement point can therefore be associated with long-distance connections along the coast of the English Channel to North Africa.

However, the connections of **the Otzenhausen, Kahlenberg** measurement point also extend to the Bodensee region and as far as the town of Vesoul. Additionally, the **Otzenhausen Kahlenberg** measurement point links to **Chateau Thierry, Av. de Paris**. The settlements associated with this measurement point were calculated based on astronomical distances.

The Prims River flows west of Kahlenberg. Historical names include

*"949 ubi Primantia, 10th century ubi Primantia, 1215–1217 per aquam... bremze"*⁷⁵.

Mantia is Latin, meaning *sleeve or arm and hand* in English; here it refers to the *river branch*. Due to the proximity to **the Otzenhausen, Kahlenberg** measurement point, *the* pre-Roman *Tri-* is more likely than *Pri-*. The original name for the Prims thus refers to *a sacred river or river branch*.

Traine Legion

Τραινή Λεγι, Τραινέ [Λ]εγίων KB
Traine Legi, Traine Legion 22

Measurement Points

⁷⁴ LIDDELL: 712.

⁷⁵ GREULE, ALBRECHT, German Book of Waterway Names, Berlin/Boston 2014: 415.

Bad Salzuflen, Wuestener Strasse
 Erft-Übergang und Einmündung des Norfbaches in die Erft.
 Foerste 2 am Harz
 Fuessen, Bahnhof
 Gauaschach, noerdlich
 Hedemünden, Römerlager
 Huppigsberg am Mühlingsbach. Bei Schwelentrup.
 Kampen
 Kempten I, Haubenschloss
 Koblenz Andernacher Strasse
 Mainz, Grosse Langgasse
 Neumagen, Römerstrasse
 Nijmegen Papengas
 Ruwer, Ruwer mündung
 Sparrenberger Egge, Wachturm
 Speyer, Binsfeld
 Strasbourg, Quai Jacques Sturm
 Toul, Rue de la Petite Boucherie
 Traben, Rieslingstrasse
 Traben-Trarbach Marktplatz
 Trier, Kaiserthermen
 Wellheim, Marktplatz
 Wolkenburg, Rhöndorf
 Xanten, Archäologischer Park

The **Traine Legion 1,2 coordinate**, as far as the Gallic distance interval is concerned, is oriented southward and along the Moselle. It links to the Gallic distance interval via **Toul Rue de la Petite Boucherie** as well as the three measurement points **Traben-Trarbach Marktplatz**, **Traben Rieslingstrasse**, and **Koblenz Andernacher Straße** on the Moselle. As with **Augousta Tribir**, there are connections to North Africa via the **Traben Rieslingstrasse** measurement point, here with the coordinates **Kastra German 2** and **Ippon Basilikos 2**.

The **Trier Kaiserthermen** measurement point, also located on the Moselle, is linked to the **coordinate Karchedon**, while the **Otzenhausen Kahlenberg** measurement point is linked to the **coordinates Ippon Basilikos 2** and **Kastra German 1**. This paints a comprehensive picture showing that close ties to North Africa existed from the lower reaches of the Moselle and the surrounding area all the way to Otzenhausen.

The pairings of coordinates with Greek distance intervals indicate military measurement points, but also river measurement points, such as the confluence of the Ruwer and the Moselle and the eastern mouth of the Rhine, the present-day mouth of the IJssel.

First and foremost, the coordinates of the pre-Roman and Roman Traine point to the present-day town of **Traben-Trarbach** on the Moselle. The town must have had supraregional significance due to its connection via rivers. This is indicated by linkages of the coordinate with river measurement points such as **Kampen on the IJssel**, **Nijmegen Papengas**, **Neumagen Römerstrasse**, and **Ruwer at the Ruwer estuary**.

The significance of Traben-Trarbach in Roman times is not derived solely from the connections between the measurement points and the **Traine 1,2 coordinate**. The additional measurement point **Traben Am Neuberg** is linked, via distance intervals, to the **coordinates Mokongiakon** and **Agrippineensei**, among others—the two main towns of the Roman provinces. This points to the town's importance. Historical forms of the place name included Trabana (9th and 12th centuries) and Travana (11th century)⁷⁶. It is possible that the current place name derives from a Roman Traine / Traiane via these intermediate forms.

The name itself is not immediately clear. Cod. Vat. Gr. 177 and 191 refer to *Traine*, while Cuntz cites *Traiane*⁷⁷. Given the location of the measurement point **Xanten Archaeological Park** *Traine* may also refer to the Roman emperor Trajan. It should be noted that figures are not always recorded by their names alone; for example, Caesar is recorded as Kaisaromagos, the Flavians as Bomoi Flavio, and Drusus as Tropeu Druson. Traine may represent a *krasis* derived from Tra-aïne, where the Greek αἶνη (*aine*) carries the meaning of *praise* or *glory* of Tra[an]. However, this is contradicted by the fact that the *krasis* remains difficult to understand, and the measurement points for the coordinate do not all fall within the reign of Emperor Trajan.

⁷⁶ FÖRSTEMANN, ERNST, *Altdeutsches Namenbuch*, 2. Band, Nachdruck der 3. Auflage, hrsg. von Jellinghaus, Hermann, München 1967: 1002.

⁷⁷ CUNTZ, OTTO: 54.

South of the Mediterranean-North Sea watershed (Dép. Haute-Saône, Dép. Doubs, Dép. Jura, Dép. Saône-et-Loire)

Diatauion

Διτάτιον Διαταύιον
Dittattion Diatauion

Measurement points

Avenches, Chem. des Conches

Bellefontaine, Source Bienne

Chalon-sur-Saone, Gué de La Benne-La-Faux

Genf, Rue de Beaulieu 1

Lux, Port Guillot

Lyon Confluence, Place Nautique

Montbeliard, Gare

Nyon, Grand Rue

Saint-Martin-du-Frene, Rue Sous Chamoise 7

Surenenpass (Übergang von der Reussebene zum Hochtal Engelberg) östlich, auch Quellgebiet mit Zufluss zur Reuss.

The measurement points **Chalon-sur-Saône**, **Gué de La Benne-La-Faux**, and **Lux Port Guillot** indicate two fords for crossing the modern-day Saône River.⁷⁸ The term *Diatauion* can be broken down into *Dia-tau-ion*, with the Greek δια (dia), meaning *through*, and the verb διαβαίνω ποταμόν (diabaino potamon), meaning *to cross a river*⁷⁹. For *-tau-*, a variant of the Greek θέω (to run) is conceivable, though not yet attested. *-ion-* or *-u-ion* may be the designation for a river or body of water, though a derivation is also lacking here. The meaning of *dia-* with *through* remains, in this case referring to the crossing of a river.

The measurement point at **Rue de Beaulieu 1 in Geneva** identifies the Sequanii, with their polis **Diatauion**, as participants in the military campaign against the Helvetii, who were attempting to bypass the Jura Mountains near Geneva.

⁷⁸ DAVID BILLOIN, LOUIS BONNAMOUR, SYLVIE MOUTON, GREGORY VIDEAU, L'agglomération de Chalon-sur-Saône de La Tène finale au début de la période gallo-romaine: un port comptoir aux origines de Cabillonum, In: L'âge du Fer dans la boucle de la Loire. Les Gaulois sont dans la ville. Actes du XXXIIe Colloque de l'Association française pour l'étude de l'âge du fer, Bourges, 1er-4 mai 2008. Tours : Fédération pour l'édition de la Revue archéologique du Centre de la France, 2009. pp. 263-278. (Supplément à la Revue archéologique du centre de la France, 35)

⁷⁹ LIDDELL: 352.

Ouisountion

Ουῖσουύντιον

Ouisountion

Measurement points

Avenches, Chem. des Conches

Bad Bergzabern, Weinstrasse

Bellefontaine, Source Bienne

Besançon Palais Granvelle

Bagny-sur-Saône

Lausanne, Camping Vidy

Les Rousses Uebergang L'Orbe zu La Bienne

Lutran. 1 km a l'est de la ville Lutran, entre les systèmes fluviaux du Rhône et du Rhin

Lyon Debourg

Melchsee, Quellgebiet Sarner Aa

Messein, Camp d'Afrique 2

Montbéliard, Gare

Otzenhausen, Kahlenberg

Rhône Gletscher

Saint-Martin-du-Frene, Rue Sous Chamoise 7 (Nasium)

Thürnen, Blittenhof

Vesoul, Place de l'Eglise

The Latin name appears as Vesontionem in Caesar (1st century BCE) and later as Visontione in the 4th century CE⁸⁰. According to Nègre, modern-day Besançon is located on the site of the Gallic polis.

The **coordinate Ouisountion** is linked via distance intervals to the three **measurement points Besançon Palais Granvelle, Vesoul Place de l'Eglise** and **Montbéliard Gare**. The measurement point **Besançon Palais Granvelle** is also linked to **Argentoraton 1, Argentoraton 2 and Kaisaromago 2**, placing the site in the context of the Gallic Wars, specifically with the 8th Legion from Argentoraton 1. The dual link with Argentoraton 1 and 2 identifies Besançon as a significant site during the Gallic Wars. Caesar's description of the location and nature of the polis (BG 1.38) identifies the Vesontionem he mentions as present-day Besançon.

The name reference also applies to Vesoul; the coordinate is linked via a distance interval to the measurement point **Vesoul, Place de l'Eglise**. The 9th-century name for Vesoul is *e castro vesulio*.⁸¹

⁸⁰ NÈGRE, ERNEST, *Toponymie Général de la France*, Vol. 1, Genf 1990: 125.

⁸¹ NÈGRE, ERNEST, *Toponymie Général de la France*, Vol. 1, Genf 1990: 674.

Measurement point Montbéliard, Gare

The measurement point is calculated using the Sequanii **coordinates Ouisountion, Auantikon, and Diatauion**. The measurement point is not located on the river but 400 meters from the river at the Montbéliard train station. The measurement point likely indicates the course of a road. The **coordinate Argentoraton 1** links to the measurement point via a half-interval (57.5 minutes), while the **coordinate Toulon 2** links via a distance interval in the decimal system (3.7). The link with **Argentoraton 1** indicates a settlement under Roman influence.

Ekouestris

Ἐκουεστρίς

Ekouestris

Measurement points

Belvedere de Mandeure (Mandeure)

Brebotte

Elzach, Alfing

Genf, Rue de Beaulieu 1

Nyon, Grand Rue (CH)

Surenenpass (Übergang von der Reussebene zum Hochtal Engelberg) östlich, auch Quellgebiet mit Zufluss zur Reuss.

Tolloy, Le

Nyon has one **measurement point, Nyon Grand Rue**, and is linked via a distance interval to **Ekouestris 1** from Cod. Vat. Gr. 177. **Nyon, Grand Rue**, is not linked to the coordinate of the same name from Cod. Vat. Gr. 191. Curiously, it is therefore correct that the measurement point located furthest to the south is calculated from the coordinate located furthest to the north.

Auantikon

Ἀυάντικον, ἀυαντικόν

Auantikon

Measurement points

Avenches, Chem. des Conches

Avenches, Bois de Châtel

Bad Bergzabern, Weinstrasse

Dole, Av. Aristide Briand

Lausanne, Camping Vidy

Lutran. 1 km a l'est de la ville Lutran, entre les systèmes fluviaux du Rhône et du Rhin
Melchsee, Quellgebiet Sarner Aa
Montbeliard, Gare
Sarre Rouge, Source

For the coordinate, the eponymous measurement point is either the Roman **town of Avenches, Chem. des Conches**, or a pre-Roman measurement point near **Avenches**, in the **Bois de Châtel**. Literally, Auantikon initially refers to a place on the opposite side (*-anti-*).

The pre-Roman Auantikon aligns with Gallic distances and is located about 1.5 kilometers east of Avenches in the **Bois de Châtel**. Of the Sequanii settlements, only **Auantikon** aligns with the measurement point. **Bois de Châtel** also connects to the **Sequana endpoint 1**, the **western mouth of the Rhône**, and in North Africa to **Ippon Basilikos 2**, thus indicating long-distance connections as far as Africa.

The Roman settlement of Auantikon is located in present-day Avenches and is the site of the Sequanii mentioned in the coordinates. It is linked to **Ouisountion** and **Diatauion**, two other sites of the Sequanii. The further association with the **coordinate Kaisaromagos 2** links the founding of the Roman settlement of Auantikon to Caesar's campaigns, most likely to his campaign against the Helvetii.

Omou etni

Ομου έθνη
Same peoples

Measurement points
Vesoul, Place de l'Eglise
Aachen, Pontstraße.

STÜCKELBERGER / GRASSHOFF interpret the numerical values accompanying the designation *same peoples* in Cod. Vat. Gr. 177 as the sum of the numbers of the previously listed peoples⁸².

However, the numerical values could also represent a coordinate. Calculated as **a coordinate**, it is located above the modern-day island of Mallorca and links, via a distance interval of 55, to the measurement point **Vesoul, Place de l'Eglise**, and via a distance interval of 93.5, to the measurement point **Aachen, Pontstraße**. A coincidence is unlikely. **Omou etni** may well be a focal point through which the Sequanii are linked via distance intervals to *similar peoples* in the western Mediterranean region.

⁸²STÜCKELBERGER / GRASSHOFF, Vol. 1: 215.

The estuaries of the Meuse and Rhine rivers

Mouth of the Mosa (Meuse)

Μόσα ποτὺς ἐκβολή Μωσα ποτὺς ἐκ
Mosa, mouth of the river

Measurement points

Bruchberggipfel, Quelle der Oker

Herten, Prinsensteerten; Einmündung der Rur / Roer in die Maas

Kassel, Hafenstrasse

Leerdam, Allg. Begraafplaats

Maasdam Vogelbuurt

Montreuil-sur-Mer, La Canche

Montreuil-sur-Mer, Rue Saint-Gengoult

Riepe bei Ihlow

Rur / Roer Quelle

Meuse, Source de la Meuse (Maas)

Moselle, Source de la Moselle (Mosel)

Speyer, Grosse Gailergasse

Terneuzen, Buitenhaven

The coordinate describes the course of the Meuse; it is linked to both the measurement point at the **source of the Meuse** and the measurement point at the Meuse estuary (**Maasdam Vogelbuurt**). It also describes the course of the Rur / Roer River from its source to its mouth at the Meuse. Since the **coordinate Mouth of the Mosa** also links to the measurement point **Moselle Source de la Moselle**, the upper course of the Moselle can be understood as part of the Meuse. The route likely continued westward from Toul along the Moselle to the present-day Meuse.

The name reference of the **Mouth of the Meuse coordinate** should primarily refer to the **Maasdam Vogelbuurt** measurement point. On a broader regional scale, the coordinate is also linked to a number of other measurement points. To the north lies a measurement point in East Frisia (**Riepe bei Ihlow**), to the east in the Harz Mountains (**Bruchberggipfel**), upstream on the Rhine in Speyer, and on the English Channel coast in Montreuil-sur-Mer.

Lougodinon

Λουγόδεινου Βατακ, Λουγόδινον
Lougodeinou Batak, Lougodinon

Measurement points
Katwijk, Nieuwe Roversbrug
Köln, Römische Hafenstrasse
Leerdam, Allg. Begraafplaats
Maasdam Vogelbuurt
Nijmegen Papengas

The **Lougodeinou Batak / Lougodinon coordinate system** uses its measurement points to delineate a region crisscrossed by major rivers. Three **measurement points in Maasdam, Leerdam, and Nijmegen** mark, from west to east, the waterways of the Oude Maas, the Beneden Merwede, the Boven Merwede, and finally the Waal. The area extends north to the **Katwijk Nieuwe Roversbrug** measurement point at the former mouth of the Oude Rhin, and south to the **Cologne Römische Hafenstrasse** measurement point on the Rhine. The measurement points indicate connections via waterways, with the area extending from northwest to southeast for more than 200 kilometers.

Λουγόδεινου (Cod. Vat. Gr. 177) and Λουγόδινον (Cod. Vat. Gr. 191) share the prefix Λουγό-, Lougo-, as the first part of the word. As far as I can tell, the etymology remains unclear.⁸³ The variant of the Indo-European root *leug-*, meaning *to bend* or *to be capable of bearing a load*, as mentioned by SCHEUNGRABER / GRÜNZWEIG, seems most likely if the beginning of the coordinate designation Lougos- is translated from the Greek Λυγός, meaning *flexible branches* or *willow branches, used for wickerwork*⁸⁴. The wickerwork made of flexible branches would have to refer to boats constructed from flexible branches, which were characteristic of the region for river transport. Cod. Vat. Gr. 177 shows Βατακ, Batak, a variant that can be understood as a *royal seat*, with Βα- as a short form of Βασιλευ, Eng. *king*. Τακ- from Θακος, Takos, meaning *a seat*⁸⁵.

Western mouth of the Rhine

Ρήνου ποταμού το δυσμικόν στομα
Western mouth of the Rhine

Measurement points
Algier Rue Hadj Omar
Cap Gris-Nez

⁸³ SCHEUNGRABER / GRÜNZWEIG: 216 ff.

⁸⁴ LIDDELL: 946.

⁸⁵ LIDDELL: 278, 687.

Gravelines
Halter am See, Weseler Strasse
Koblenz Andernacher Strasse
Leerdam Allg. Begraafplaats
Maasdam Vogelbuurt
Nijmegen Papengas
Speyer Grosse Gailergasse

The coordinate of the western mouth of the Rhine is linked to the three **measurement points** in **Maasdam**, **Leerdam**, and **Nijmegen**, along the Oude Maas to the Waal (see **Lougodinon**). It is conceivable that, of these, the **Leerdam Allg. Begraafplaats** measurement point represents the western Rhine estuary. This is also supported by long-distance connections **of the western Rhine estuary coordinate**, which links to the measurement point in **Algier, Rue Hadj Omar**, as well as the connections of the **Leerdam Allg. Begraafplaats** measurement point. Conversely, the latter links to the North African **coordinates Ippon Basilikos 1** and **Germiana 1**. The western mouth of the Rhine was thus a gateway for trade with North Africa.

Middle Mouth [of the Rhine]

το μέσον στόμα
Middle Mouth [of the Rhine]

Measurement points
Bad Lippspringe, Quelle der Lippe
Muenster Hauptbahnhof
Nijmegen Papengas
Wesel, Zitadelle

The **Middle Rhine Estuary** includes four measurement points, one of which is directly connected to the Rhine: the **Nijmegen Papengas** measurement point. The coordinate also describes the course of the Lippe River, as it links the **Bad Lippspringe** measurement point (**source of the Lippe**) with the Lippe's confluence with the Rhine at **the Wesel Citadel** measurement point.

Eastern mouth [of the Rhine] 1,2

Το ανατολικον στόμα
Eastern mouth [of the Rhine]

Measurement points
Bonn, Colmantstrasse
Bruchberggipfel, Quelle der Oker

Brunsbuettel, Einfahrt NOK
Eider, alte Flussmuendung
Ems-Muendung bei Pogum
Hamburg Graskellerbrücke
Hedemünden, Römerlager
Kampen Koornmarkt
Mellum 2

Both coordinates are linked to the **Kampen Koornmarkt** measurement point, where the eastern mouth of the Rhine is located. Both coordinates are also linked to measurement points marking river courses to the north and east, such as the mouths of the Weser, the Ems, and the Eider. One measurement point marks the **headwaters of the Oker**, a river that flows into the Weser via the Aller. In the lower reaches of the Elbe, there are two measurement points: **the Brunsbüttel NOK Entrance** and **the Hamburg Graskeller Bridge**. The latter measurement point is certainly part of a battle scene (see under *Geography in the Service of Military Commanders*).

Botamodouron 1,2

Βοταμοδουρον, Βοταυόδουρον
Botamodouron, Botauodouron

Measurement points
Asterlagen Rheinhausen
Bonn Endenich
Brilon Fluss Aa beim Zufluss der Flüsenbecke.
Gellep-Stratum Duesseldorfer Strasse
Hamburg Speersort
Katwijk Hoorneslaan
Katwijk Nieuwe Roversbrug
Kerkrade Kasteel Erenstein
Krefeld-Cracau Schubertstrasse
Leerdam Allg. Begraafplaats
Montreuil-sur-Mer La Canche
Roermond Roode Brug
Wesel Zitadelle
Xanten Archäologischer Park

The **coordinates Botamodouron 1,2** correspond to several measurement points in the town of Katwijk (**Katwijk Nieuwe Roversbrug**, **Katwijk Hoorneslaan**); the coordinate designation certainly refers to the present-day town of Katwijk. Ancient **Katwijk** was thus a transportation hub for maritime traffic from Africa all the way to the Elbe region; traffic also flowed upstream into the Rhine and Meuse rivers. Furthermore, the **coordinate Albis Muendung** links to the **Katwijk Nieuwe Roversbrug** measurement point, highlighting the town's importance for

shipping traffic from the Elbe. From North Africa, the **coordinates Karchedon** and **Kastra German 2** link to the **Katwijk Hoorneslaan** measurement point, confirming the close connection between the ancient estuary and North Africa.

The name **Botamodouron**, **Botauodouron** can be broken down into Bot-amo-douron. *Bot*, meaning *boat*, as in modern German *Boot*, English *Boat*, and French *Bateau*. Since this likely refers not to a developed harbor but to a natural mooring site, *-amo-* can be derived from the Greek ἄμμος (*ammos*), meaning *sand*⁸⁶. *Bot-amo-* thus denotes a place where *boats are pulled onto the sand*. **Botamodouron 1,2** refers geographically to the present-day town of **Katwijk**, and both names are likely synonyms. *Ka-* / *Kat-* then has the meaning of *boat*, while the common forms *-wijk* / *-wik* / *-wiek* can be interpreted synonymously as *landing place* or, more generally, *bay*.

Kastellon

Κάστελλον καστελλον Μενάπιοι
Kastellon Kastellon Menapioi

Measurement points

Arras Espace Vauban

Bad Bergzabern Weinstrasse

Bavay Chemin Delmaire

Buchten Bettinumstraat

Camp des Belges 2, a une distance d'environ de 4 km du camp de Caesar, pres de Berry-au-Bac, avec Menapii, Atrebatii

Herten Prinsensteerten Einmündung der Rur in die Maas

Karthago Galeerenhafen

Kleve Emmericher Strasse

Krefeld-Cracau Schubertstrasse

The name of **the coordinate Kastellon** is mentioned in the coordinate descriptions together with the Menapii ethnic group. The polis Kastellon represents the main settlement of the Menapii.

Caesar reports that the Menapii owned fields, villages, and farms on both sides of the Rhine, but were even harassed by the Germanic tribes on the left bank after the latter had crossed the Rhine⁸⁷. Some Germanic tribes subsequently even crossed the Meuse on raiding expeditions and had invaded the territory of the Ambivari in that region. All of this must have taken place not far from the confluence of the Meuse and the Rhine, as another passage in the text suggests.

⁸⁶ See the entry for Gesoriakon.

⁸⁷ BG 4,4,1

Caesar's account provides a fairly accurate picture of the area where the Menapii lived and where their capital, Kastellon, must be located. This must be an area stretching roughly from the city of Kleve in the north to the city of Krefeld in the south.

There are several associations for the **Kastellon coordinate**. The measurement point in **Kleve** is associated with the Gallic distance interval 9, which should be interpreted as a prominent insertion into the coordinate system. The measurement point **Krefeld-Crakau**, on the other hand, is associated with the Greek distance interval 11.5. Locating **Kastellon at the Kleve Emmericher Straße** measurement point is also preferable due to the more convenient access to the Rhine.

The name of the coordinate can be broken down into *Ka-stellon*; *Ka-* is a morpheme meaning *ship, ships, or boat*, parallel to *Ka-rhedon*. For *-stellon*, both a Greek and a Germanic etymology are plausible. Gr. *Στέλλω*, *stello*, eng. *to equip, to put in order*. German *stellen*: *to place, to manufacture, to set up* in the sense of placing. The meaning of *Ka-stellon* is thus *ship outfitter, shipbuilder*.

This explanation is supported by the coordinate description. STÜCKELBERGER / GRASSHOFF translate:

“...beyond the river Mosa / Maas live the Menapii with their city...”⁸⁸ .

Beyond the river is to be understood in the context of the list as east of the Meuse River, which applies to Kleve.

⁸⁸ STÜCKELBERGER / GRASSHOFF, Bd. 1: 211.

Between the Rhine, Sieg, and Maas rivers

Nauaision 1.2

Νουαίσιον Ναυαίοιον
Nouaision Nauaision

Measurement points

Bad Lippspringe Quelle der Lippe
Bad Salzuflen Wuestener Strasse
Braunschweig Neue Strasse
Darmstadt Zeughausstrasse
Erft-Übergang und Einmündung des Norfbaches in die Erft.
Fritzlar Rosenturm
Gauaschach noerdlich
Glauberg bei Glauburg
Goettingen Jheringstrasse
Hamburg Graskellerbrücke
Hedemünden, Römerlager
Höngeda 1,7 km westlich vom heutigen Ort
Huppigsberg am Mühlingsbach. Bei Schwelentrup.
Kempten I Haubenschloss
Kempten III
Neckarquelle Schwenningen
Radenhausen bei Amoeneburg
Ravensburg, Blaserturm
Schlitz Grabenberg
Siegburg Am Herrengarten
Sparrenberger Egge, Wachturm
Ulrichsecke und Hattenberg beim Ort Niederaula an der Fulda
Vehrte bei Kalkriese
Werben Raebel
Wieseck Kesslerstrasse
Wirges Siemensstraße
Xanten Archäologischer Park

STÜCKELBERGER / GRASSHOFF assume that Ptolemy erroneously lists **Nauaision** as being located in Germania and that the site must be found on the left bank of the Rhine in Gallia Belgica⁸⁹. As demonstrated in this work, coordinates do not mark a point on the Earth's surface. Nevertheless, their approach is partially correct, as the measurement point that gave **Nauaision** its name is located on the left bank of the Rhine along the Erft River.

⁸⁹ STÜCKELBERGER / GRASSHOFF, Bd. 1, p. 231

However, the measurement point does not refer to a former Roman legionary camp in what is now the Gnadenthal district of Neuss, but rather marks a **location on the Erft River**, about 1,5 kilometers from the present-day Rhine and near the confluence of the Norfbach and the Erft. The name of the coordinate, **Νουαίσιον, Ναυαίσιον**, suggests that the first part of the word derives from the Greek *ναύς (naus)*, meaning *ship*. The meaning is therefore a *ship river* or a *ship station*. To date, there is no evidence from the coordinate's associations to support the existence of a Roman camp named Novaesium.

The use of the ship station by the Roman military can be inferred from the connection of the measurement point with the **coordinates Traine 1, Bonna 1, and Ouetorra 1**, all linked to locations of Roman legions. The site was apparently also of supraregional importance. From North Africa, the **coordinates Ippon Basilikos 1 and 2**—today's Annaba in northern Algeria—are linked to the measurement point with a distance interval. The site was thus also a maritime destination from North Africa.

Measurement points for military events

The **Nauaision 1,2 coordinates** were also used to plot measurement points related to military events; see the entries under *“Geography in the Service of Military Commanders”* for more on this. Placing the coordinate on the right bank of the Rhine was necessary for mathematical or cartographic reasons in order to obtain an additional axis for triangulation. With one-way triangulation, it is not possible to achieve the required accuracy. A supplementary triangulation at a 90-degree angle provides the optimal solution.

Agrippineensei

ἄιρε οπιπη ικοσησ, Αγρίππίνηνσσει

Aire Opipe Ikoses, Conquered Observation Point of the Ikosians, Agrippineensei

Measurement points

Asterlagen Rheinhausen

Buchten Bettinumstraat

Foerste 2 am Harz

Gellep-Stratum Duesseldorfer Strasse

Hottendorf Laugebachquelle, greek Dist.

Kerkrade Kasteel Erenstein

Kerpen Am Bruch

Köln Römische Hafenstrasse

Lahnstein Mündung der Lahn

Roermond Roode Brug

Siegburg Am Herrengarten

Siegquelle Rothaarsteig

Strasbourg Quai Jacques Sturm

Traben Am Neuberg

Vehrte bei Kalkriese
Vehrte near Kalkriese
Wesel Citadel
Wirges Siemens Street
Wolkenburg Rhöndorf

For the same latitude and longitude, two different names are given for the coordinate. Cod. Vat. Gr. 177 lists the name **Conquered Observation Point of the Iksians**, while Cod. Vat. Gr. 191 lists the name **Agrippineensei**.

The term **Agrippineensei** refers to the **Cologne Römische Hafenstraße** measurement point and thus to Roman Cologne. It undoubtedly refers to Iulia Agrippina, sister of the Roman Emperor Caligula and mother of Emperor Nero. CUNTZ reads Agrippinensis⁹⁰, but a breakdown into *Agrippine-ensei*, with ἐνσεῖω, eng. *to shake or fall*, is also possible—a characteristic referring to Agrippina herself. The indication of a characteristic or distinctive feature is also found in the coordinates for Drusus, the Flavians, and Caesar, and is therefore to be expected here as well.

The designation **Conquered Observation Point of the Iksians** refers to the measurement point **Wolkenburg near Rhöndorf**, which in turn is linked to the **coordinate Iksion**.

The coordinate itself is older, and its earliest use can certainly be dated to before the lifetime of Iulia Agrippina. This follows from its linkage to the measurement point **Hottendorf Laugebachquelle Greek Dist.**, which is understood to be the site of the winter camp of the future Emperor Tiberius at the source of the River Lupia, between 4 and 6 CE⁹¹. The naming after Agrippina overrode an older designation; this may have been the naming after the **conquered observation point of the Iksians**. It is also possible that an earlier naming occurred in connection with Rome's Germanic Wars following the defeat by Arminius in 9 AD.

The linking of the Cologne measurement point with the **Germiana 2 coordinate** in North Africa is not unique. Between the Rhine and Roer/Rur rivers, numerous measurement points are linked to coordinates in North Africa. The second Cologne measurement point, **St. Aposteln**, also has connections to North Africa, with a link to **Iksion**, today's Algiers. The same applies to the **Kerkrade** measurement point, which is linked to **Germiana 2**, and especially to the **Roermond, Roode Brug** measurement point, which has three links to **Iksion**, **Kastra German 2**, and **Germiana 1** in North Africa.

⁹⁰ CUNTZ, OTTO: 54.

⁹¹ PATERCULUS: 2,105.

Ouetorra 1,2

Ούέγερρα Λεγι Λ ουλπια, Όουετόρρα
Ouegerra Legion 30 Ulpia Ouetorra

Measurement points

Asterlagen Rheinhausen

Bonn Endenich

Boulogne-sur-Mer, Plage

Buchten Bettinumstraat

Erft-Übergang und Einmündung des Norfbaches in die Erft.

Gellep-Stratum Duesseldorfer Strasse

Gravelines

Kampen Koornmarkt

Kerkrade Kasteel Erenstein

Kerpen Am Bruch

Köln Römische Hafenstrasse

Köln St. Aposteln

Krefeld-Cracau Schubertstrasse

Leerdam Allg. Begraafplaats

Maasdam Vogelbuurt

Radenhausen bei Amoeneburg

Roer Quelle

Roermond Roode Brug

Ruwer Ruermündung

Strasbourg Quai Jacques Sturm

Traben Rieslingstrasse

Vehrte bei Kalkriese

Vienau (Milde)

Werben Raebel

Westerschelde vor Cadzand

Wiesbaden Schuetzenhofquelle

Xanten Archäologischer Park

The measurement points for the coordinate are primarily located in the area between the Meuse and Rhine rivers, on both sides of the Roer / Rur River, which originates in Belgium and flows into the Meuse near the city of Roermond in the Netherlands. The **source of the Roer** is marked with a measurement point, as is the **river's mouth where it flows into the Meuse**.

Both variants of the coordinate, Ouegerra and Ouetorra, begin with the place prefix *Ou-* and end with the designation for a river, *-ra*; the middle part is a qualification or addition to *-ra*, which is either *-ger-* or *-tor-*. With *-tor-*, there is a parallel naming convention to *-tor-* in the coordinates **Tatorion** and **Argentoraton**. Based on the measurement points marking the river mouths, a possible meaning for *-tor-* is *access or entrance*.

Interpreting the *suffix -ger-* is more difficult, and a possible connection to the name of the Germanic peoples does not make an explanation any easier, given the ambiguity of ethnic

names. However, the term appears in an area between the Rhine and the Roer / Rur, which provides the first indication of the Germanic name⁹². However, further points of connection are lacking.

Even without a more precise identification of the middle part of the word, it is clear that the coordinates refer to a river. The measurement points indicate that this is the Roer / Rur.

Cod. Vat. Gr. 177 provides the addition “Legio 30 Ulpia” for the coordinate Ouegerra. It is known that the 30th Legion was established at the beginning of the 2nd century CE and was not stationed in Lower Germania until the end of the second or beginning of the third decade⁹³. The revision of the Ouegerra coordinate by adding the 30th Legion cannot therefore be dated before the third decade of the 2nd century AD. The coordinate links to the **Xanten Archaeological Park** measurement point with a distance interval of 7.3, thus establishing the connection between the 30th Legion and the site in Xanten.

Bonna 1,2

Βωννα Βόννα

Bonna

Measurement points

Annaba Rond Point Joannonville

Annaba Route vers El Hadjar

Augsburg Jakoberwall

Bad Lippspringe Quelle der Lippe

Bad Salzuflen Wuestener Strasse

Bad Wimpfen 2 Neckar

Barbelroth Horbach

Bodman Altbodman

Bohmte Ovelgoenne

Bomlitz Am Hoop

Bonn Colmantstrasse

Boué Le Pavillon

Bregenz Leutbühel

Braunschweig Neue Strasse

Darmstadt Zeughausstrasse

Erft-Übergang und Einmündung des Norfbaches in die Erft.

Esch-sur-Alzette Rue de Belvaux

Euskirchen Euro-Park

Foerste 2 am Harz

Gauaschach noerdlich

⁹² GRIMM, Vol. 1: 545.

⁹³ Reuter, Marcus. Legio XXX Ulpia Victrix. Ihre Geschichte, ihre Soldaten, ihre Denkmäler. Xantener Berichte, Band 23. Darmstadt / Mainz 2012: 11.

Genf Rue de Beaulieu 2
 Hamburg Graskellerbrücke
 Hedemünden Römerlager
 Herten Prinsensteerten; Einmündung der Rur / Roer in die Maas
 Hottendorf Laugebachquelle, greek Dist.
 Huppigsberg am Mühlingsbach. Bei Schwelentrup.
 Kampen
 Kerpen Am Bruch
 Lahnstein Mündung der Lahn
 Mannheim Paradeplatz
 Montreuil-sur-Mer, Rue de l'Eglise
 Radenhausen bei Amoeneburg
 Roermond Roode Brug
 Solesmes 1 sur la Selle
 Speyer Binsfeld
 Speyer Grosse Gailergasse
 Terneuzen Buitenhaven
 Traben Rieslingstrasse
 Traben-Trarbach Marktplatz
 Vehrte bei Kalkriese
 Vienau (Milde)
 Villeneuve-Saint-Germain Aisne
 Werben Raebel
 Werben Raebel
 Wieseck Kesslerstrasse
 Wiesbaden Schuetzenhofquelle
 Wien Stubenring
 Wirges Siemensstraße
 Worms Bahnhofstrasse

The **coordinate Bonna** refers to the modern-day city of Bonn; the measurement point is located on **Colmantstrasse in Bonn**. There are other locations in northern, western, and southern Germany, as well as in northern France, that are linked to the **Bonna** coordinate; the measurement points are located in **Bomlitz, Bohmte, Bodman, and Boué**, among other places. The measurement points **Bonn Colmantstrasse, Bomlitz Am Hoop, and Bodmann Altbodman**, in turn, have a close connection to North Africa, specifically to the modern city of Annaba, as they are linked to the **coordinate Ippon Basilikos 1,2**. Conversely, the **coordinate Bonna 2** refers to measurement points in Annaba, namely the measurement points **Annaba Rond Point Joannonville** and **Annaba Route vers El Hadjar**. See the entry for **Ippon Basilikos 1,2**.

The measurement point **Bonn Colmantstrasse** may not necessarily have had a prominent role among the mentioned measurement points, yet it was well-connected regionally—extending into the Moselle region as far as Trier, along the Rhine past present-day Mainz to the Strasbourg area, and downstream past Asterlagen to the Rhine's eastern mouth into the IJsselmeer.

The **coordinate Ouetorra 2** has a measurement point in **Bonn Endenich**. Together with **Bonn Colmanstrasse**, this shows that the measurement points are located one or two kilometers west of the Rhine and by no means near the Rhine.

The **coordinates Bonna 1,2** with Greek distance intervals were used during the Roman Empire to mark battle sites and military locations for Roman military units; this applies, among others, to the measurement points **Solesmes 1, sur la Selle** (*Battle of the Sambre*) and **Förste 2 am Harz** (*Battle of Idistaviso*).

Aliso

Ἀλίσσον, Αλίσσο
Alsison, Aliso

Measurement points
Siegburg Am Herrengarten
Sieg Siegquelle
Aachen Pontstrasse
Bonn Endenich
Buchten Dorpstraat
Euskirchen Euro-Park
Frankfurt Braubachstrasse
Kerpen Am Bruch
Köln Römische Hafenstrasse
Roer Quelle
Sidi Bellatar am Fluss Chelif
Wolkenburg Rhöndorf

The coordinate primarily corresponds to measurement points between the Rur/Roer, Rhine, and Sieg rivers. The name apparently derives from the measurement point **at Siegburg, Am Herrengarten**, on the Sieg River—a tributary of the Rhine—as well as the measurement point near the **source of the Sieg**.

Aliso can be broken down into *A-li-so*: *a-*, the locative particle meaning *where* or *to*; *-li-*, a term for bodies of water; and *-so*, derived from the Greek Σόοσ, meaning *strong, rapid movement*, particularly an upward movement⁹⁴. *-li-so-* thus refers to a river with a rapid, strong flow of water.

GREULE lists the historical names *Sigina* (10th century), *Sigin* and *Sigam* (11th century), and *Sigam* (11th century) for the Sieg River and considers it possible, that the river's name is derived from the Celtic *sego-*, meaning *strength or power*⁹⁵. This thus represents a naming convention for identical or very similar attributes in two languages. The morpheme *-so-* occurs

⁹⁴ LIDDELL: 1476.

⁹⁵ GREULE, ALBRECHT, Deutsches Gewässernamenbuch, Berlin und Boston, 2014: 498.

in connection with names of bodies of water and characterizes the river's flow as strong and fast⁹⁶.

Regarding Alsison: In the case of Alsison, the water body designation would be -sison, which presupposes a shift from l- to s- compared to A-liso. This shift can be assumed for a number of river names. The modern river name Sieg may have developed from Alsison.

Budoris

Βουδωρις, Βουδορίς
Boudoris

Measurement points
Aachen Pontstrasse
Euskirchen Euro-Park
Wirges Siemensstraße
Wolkenburg Rhöndorf

The coordinate refers to the measurement point **Wirges Siemensstrasse**, on the right bank of the Rhine. Other measurement points are located in the area between the Rhine and Rur / Roer rivers.

Probably a combination of Bou-, meaning *place* (see the entry for **Ippon Basilikos 1,2**), and -*doris*, the name of the Dorian ethnic group. The meaning of Boudoris would thus be *place of the Dorians*. References to ethnic groups are occasionally found in the coordinate descriptions. In addition to the Dorians, the Aryans (see entry **Argentoouaria**) and the Tiois (see entry **Kantioibis**) are also found in coordinate designations.

⁹⁶ DELMARRE, XAVIER: 279.

On the Rhine from Mainz to Augst

Mokongiakon

Μοκονγιάκον Μοκονγιάκ[]
Mokongiakon

Measurement points

Bad Wimpfen 1 Corneliastrasse

Barbelroth Horbach

Bonn Colmantstrasse

Buchten Bettinumstraat

Frankfurt Braubachstrasse 25

Graffenstaden Rue du Commerce, Embouchure de l'Ehn

Hannoversch Münden Wallstraße

Kembs - Schaeferhof zwischen Rhein und Rheinseitenkanal

Koblenz Andernacher Strasse

Lahnstein Mündung der Lahn

Mainz Grosse Langgasse

Mainz Zollhafenbrücke

Neumagen Römerstrasse

Speyer Grosse Gailergasse

Traben Am Neuberg

Wellheim Marktplatz

Wirges Siemensstraße

The **Mainz Grosse Langgasse** measurement point is calculated from the south; references to the Gallic system characterize the measurement point. Linked to this measurement point are the coordinates **Sekoana Endpoint 1, the confluence of the Arar and Dubis rivers**, and **Augusta Treverorum 2**. There are no links to the north, with the exception of one coordinate, notably **Mattiakon**. There is a link to the coordinate **Noiomagos**, i.e., Speyer, which is located further south, also on the banks of the Rhine.

The name indicates a ford across the Rhine; when broken down into *Mo-kon-gia-kon*, *-gia-* is to be read as ford, related to the Greek *-δια-* and the German *durch* (see the entry for Diatauion). The ford was located at the site of today's Zollhafen. About 400 meters to the south, a garrison of Caesar's troops from **Bonna 1,2** and from **Argentoraton** is marked with a measurement point. The garrison was certainly connected to a Rhine crossing about one kilometer to the southeast, at the end of today's Petersaue Island. It is likely that the location of a bridge is marked here with the measurement point **Mainz Kastel** in today's Rhine. The coordinates for the measurement point indicate that workers and certainly also materials were brought upstream from Fessenheim and Breisach (coordinate **Argentoouaria**) and from the Speyer area (coordinate **Noiomagos**) for the project.

Obrigka

Ουριδα ποτ., οβριγκα
Ourida, Obrigka

Measurement points

Bad Wimpfen 1 Corneliastrasse

Bad Wimpfen 2 Neckar

Heidelberg, auf dem Heiligenberg

Neckarquelle Schwenningen

Traben, Am Neuberg

Worms, Bahnhofstrasse

Ourida or **Obrigka**, with a measurement point on the **Heiligenberg** near Heidelberg, above the Neckar River. It therefore stands to reason that this is a compound of ob-brigka, with the Gallic -briga meaning *hill, mountain*, or, figuratively, possibly *fortress*⁹⁷, and the Germanic ob-meaning *on*. The meaning is thus *on the mountain*. The mountain name was also used to mark measurement points along the Neckar River. The river name itself is not mentioned in the coordinate descriptions.

Starting from the coordinate, the course of the Neckar River has been measured all the way to the **Neckarquelle in Schwenningen**. The measurement point **Bad Wimpfen 2 Neckar** and the measurement point **Neckarquelle Schwenningen** are additionally linked via distance intervals to the coordinate **Bomoi Flavio**, Altar of the Flavians, and also to coordinates associated with legionary sites (**Bonna 2** near **Bad Wimpfen 2**, **Nauaision 1** and **Traine 2** near the **Neckar source in Schwenningen**). Thus, both measurement points must be understood as Flavian conquests by Emperor Domitian; the conquest of the source symbolically represents the conquest of the Neckar River as a whole.

The **Bad Wimpfen 2 Neckar** measurement point is located in the Neckar River, at the confluence with the Jagst River. It is conceivable that this location marked a crossing over the Neckar River.

Noiomagos

Νοιόμαγος
Noiomagos

Measurement points

Bad Bergzabern, Weinstrasse

Barbelroth, Horbach

⁹⁷ DELAMARRE, XAVIER: 87.

Graffenstaden, Rue du Commerce, Embouchure de l'Ehn
Mainz, Grosse Langgasse
Mainz Kastel im Rhein
Mannheim, Paradeplatz
Neumagen, Römerstrasse
Speyer, Binsfeld

The city of Speyer has **three measurement points**. The northernmost measurement point is associated with Roman military operations, and the name **Noiomagos** can refer only to this measurement point. This is the **Speyer Binsfeld** measurement point, located about four kilometers north of Speyer's Old Town. It is linked via Greek distance intervals to the coordinates **Bonna 2**, **Traine 2**, **Artaunum 1**, and **Noiomagos**. Its location on the waterfront suggests a Roman shipyard or naval base.

A central measurement point in Speyer is located on **Grosse Gailergasse**, which does not link to Noiomagos. The link between this measurement point and the coordinates **Mosa Mündung** and **Renos Westliche Muendung** indicates that Speyer must have been a trading hub. Downstream on the Rhine, other coordinates point to connections with Mainz, Südhessen, and the Bonn area, as well as the Saar and Ruwer rivers.

Another measurement point is located in today's **oil port**, which also does not align with the **Noiomagos coordinate**. The aligned coordinates for this measurement point point primarily upstream along the Rhine, as far as the Breisach area.

Six league stones discovered in 1936 in the Bienwald forest near the town of Hagenbach, at the point where the ancient Roman road crosses today's K 19, represent a special feature⁹⁸. Five of them indicate the distance to Nementum as 16 Gallic leagues. 16 Gallic leagues are calculated as 0.1683 kilometers *12/10*11, with 2.22156 kilometers per league *16 = 35.54496 kilometers to Nementum. The distance from the discovery site to the **Grosse Gailerstrasse** measurement point in Speyer is only 28 meters shorter. However, this would mean that, at least up until the time of Emperor Trajan, distances on milestones were given as straight-line distances rather than road distances. If the figure refers to a straight-line distance, this resolves the issue that the road distance to Speyer measures significantly more than 16 leagues.

Barbelroth measurement point

Measurement point
Barbelroth, Horbach

The measurement point is associated with a Roman military operation. This follows from the interval with the coordinates **Bonna 2**, **Argentoraton 1**, and **Kaisaromago 2**. Since the latter

⁹⁸ See SPRATER, FRIEDRICH, Funde von Leugensteinen in der Pfalz, in: Germania, Vol. 21 No. 1, 1937: 28–33.

two coordinates are associated with military operations from the Gallic Wars—notably **Kaisaromago 2**—a connection to Caesar’s operations should be given preference over military operations from the Roman Imperial period.

Borbetomagos 1,2

Βορβητο μ.γ., βορβετόμαγο
Borbetomago[s]

Measurement points

Bad Bergzabern, Weinstrasse

Bourogne, Rue de Belfort

Brebotte

Graffenstaden, Rue du Commerce, Embouchure de l'Ehn

Heinrichswil, Dorfstrasse

Heinrichswil, Haltenstrasse

Strasbourg, Chemin de Gliesberg, Embouchure de la Bruche

Tolloy, Le

Toul, Rue de la Petite Boucherie

Trier, Kaiserthermen

Worms, Bahnhofstrasse

The measurement points that give the coordinate Borbetomagos its name are located near the La Bourbeuse River in the Territoire de Belfort department, in the town **of Brebotte** and in **Bourogne, Rue de Belfort**. The measurement point in **Bourogne** corresponds to the coordinate **Kaisaromagos 1**, making Bourogne either a Roman foundation or a new settlement from Caesar’s time. Both measurement points correspond to coordinates that can be assigned to the other, eastern side of the Rhine. The Vangiones ethnic group had connections across the Rhine.

The name of the people according to Ptolemy 1,2 is Ouagionon, Latin Vagiones, or traditionally Vangiones in German; the name of the city of *Worms* is derived from this ethnic group. The measurement point in **Worms** is located on **Bahnhofstrasse** and corresponds to the coordinate **Borbetomagos 2**. As with other Roman settlements or new establishments, the measurement point is situated on a road—in this case, at the site of the present-day train station (cf. the measurement points in Münster and Füssen)—which was apparently built in the 19th century along a historic road axis.

Since the **Worms Bahnhofstrasse** measurement point lacks a link to **Kaisaromagos**, the Roman settlement of Worms must be dated to a later period than the settlements in the vicinity of the La Bourbeuse River. The adoption of the name of the ethnos as the city name also points

toward a post-Caesarian dating. Naming major towns after the ethnos also represents a more recent development in Gaul⁹⁹.

Another measurement point is located in **Bad Bergzabern, on Weinstrasse**. Based on the connections with distance intervals, the measurement point can be attributed to several ethnic groups: the **Sequanii** (with the **coordinates Auantikon and Ouisountion**), the Nemetes (with the **coordinate Noiomagos**), the Vangiones (coordinate **Borbetomagos 1**), and the Menapii (**coordinate Kastellon**).

Urakok m.g., Brakomagos

Υράκοκ μ.γ. Βρακόμαγο[]
Urakok m.g., Brakomago[s]

Measurement points

Breisach, Josef-Bueb-Strasse
Mannheim, Paradeplatz
Speyer, Oelhafen
Strasbourg, Chemin de Gliesberg, Embouchure de la Bruche
Strasbourg, Quai Jacques Sturm

The measurement point for the coordinates **Urakok m.g. / Brakomagos 1,2** is **Breisach, Josef-Bueb-Strasse**. The second measurement point, applicable only to the coordinate Urakok m.g., is **Strasbourg, Chemin de Gliesberg, Embouchure de la Bruche**, the mouth of the Bruche River where it flows into the Ill River.

The designation **Urakok m.g.** applies only to the measurement point at the **mouth of the Bruche River** where it flows into the Ill River (**measurement point Strasbourg, Chemin de Gliesberg, Embouchure de la Bruche**). The particle *-ra-* denotes a river or body of water here.¹⁰⁰ *-Kok* can be derived from the Greek *Ἀκωκή*, meaning *point, boundary, or edge*. Urakok thus signifies *river boundary* = the mouth of the Bruche where it flows into the Ill (see the analogous construction of **Roufiana** for reference). The designation is consistent with the location of the measurement point.

The measurement point for the coordinates **Urakok m.g. / Brakomagos 1,2, Breisach Josef-Bueb-Strasse**, is one of the measurement points linked to the measurement point **Chateau-Thierry Avenue de Paris**, via distance intervals. Chateau-Thierry is part of the pre-Roman settlement of Dourokottoron.

⁹⁹ See also ROUCHE, MICHEL, Le changement de nom des chefs-lieux de cités en Gaule au Bas-Empire, in: Le choc des cultures: Romanité, Germanité, Chrétienté durant le Haut Moyen Âge. Villeneuve d'Ascq, 2003. <http://books.openedition.org/septentrion/55073>

¹⁰⁰ For *ra*, see Part VI, *Water-related words ending in -ra- / -ru- / -ri-*

Both coordinate names (Urakok and Brako) may well be related if a shift from u" to b" has occurred. This shift is also found regionally not far away in the river name Ourida (Ουριδα ποτ) in Cod. Vat. Gr. 177, which is contrasted with Obrigka (οβριγκα) in Cod. Vat. Gr. 191.

Argentoraton 1,2

Αργεντόρατον
Argentoraton

Measurement points

Augst, Römisches Theater
Barbelroth, Horbach
Basel, Bebelstrasse
Berry-au-Bac, Rue du Moulin
Besançon Palais Granvelle
Bonn, Colmantstrasse
Bagny-sur-Saône
Colm la Runga 2 Roemerlager
Elz - Flussquelle
Esch-sur-Alzette Rue de Belvaux
Gauaschach nördlich
Graffenstaden, Rue du Commerce, Embouchure de l'Ehn
Haltern am See, Weseler Strasse
Heinrichswil, Dorfstrasse
Innsbruck Universitätsstrasse
Kembs - Schaeferhof, zwischen Rhein und Rheinseitenkanal
Mannheim, Paradeplatz
Montbeliard, Gare
Neumagen, Römerstrasse
Ravensburg, Blaserturm
Sarreguemines, Einmündung der Blies
Solesmes 1, sur la Selle
Strasbourg Quai Jacques Sturm
Thürnen, Blittenhof
Trier, Kaiserthermen
Weiherkopf und Passhöhe
Wellheim, Marktplatz
Werben Raebel

The designation **Argentoraton 1**, along with the longitude and latitude, is found in Cod. Vat. Gr. 177, but not in Cod. Vat. Gr. 191. STÜCKELBERGER / GRASSHOFF assume that the coordinate Argentoraton was also present in Vat. Gr. 191, but that the information regarding the longitude and latitude of Argentoraton was erroneously assigned by copyists to the

preceding coordinate, Borbetomagos, in the list. This would thus represent the same error as with the coordinate Rhodos, which is also not included in the coordinate list and whose longitude and latitude are said to be listed with the neighboring city of Lindos, according to STÜCKELBERGER / GRASSHOFF¹⁰¹.

The **Argentoraton 2**, interpolated by STÜCKELBERGER / GRASSHOFF, is linked to a **measurement point at Strasbourg Quai Jacques Sturm** in Strasbourg, which **Argentoraton 1** (from Vat. Gr. 177) does not provide. This measurement point is an important military measurement point, as evidenced by the linkages of **Strasbourg Quai Jacques Sturm** with a Greek distance interval to the **coordinates Kaisaromago 1, Ouetorra 2, Traine 2, and Agrippineensei**. It is therefore conceivable that the **coordinate Argentoraton 2** (in Cod. Vat. Gr. 191) was already missing from the manuscript copy of Ptolemy, or was hidden behind another coordinate to prevent the calculation of a military base's location.

The measurement point for **Argentoraton 1,2** is located in **Graffenstaden, Rue du Commerce, at the confluence** of the **Ehn** and **Ill** rivers. The name **Argentoraton** thus refers to a river location at the mouth of the Ehn. An older name for the Ehn was Ergers until the 18th century,¹⁰² for which the designation Argenza was known in the 11th century.

The Roman camps on the Grande Île in Strasbourg were not established until the end of the 1st century AD, so that their inclusion in the coordinate corpus would have been possible only by a narrow margin. According to current research, no measurement point is located there. Following recent findings, THIERRY LOGEL has pointed out that the particle *-rat-* in **Argentoraton** does not denote an earthen rampart and thus does not refer to the traditional understanding of the fortification of the Roman camps on the Grande Île, but rather is to be understood as a location at a river crossing, a ford¹⁰³.

Argentoraton is possibly a krisis and can be broken down into *Ar-gen-tor-ra-ton*. *-Ra-* clearly refers to a river, *rat-on* - according to LOGEL- refers to a ford. In the first element, the breakdown yields *-gen-tor-*, which appears alongside *-gan-* in **Ganodouron** and alongside *-den-* in **Prodentia**. In all three cases, these are likely dialectal forms of a meaning corresponding to the Latin *gens*, meaning *clan, tribe, or ethnic group* (see also under **Prodentia**). When *-tor-* is present, it denotes an access point to the Ehn River.

The name **Argentoraton** thus originally refers to a river crossing in the area where the Ehn flows into the Ill and to an ethnos settled there.

The coordinates Argentoraton, Urakok m.g., and the 8th Roman Legion.

Cod. Vat. Gr. 177 assigns the **8th Roman Legion** to the **coordinate Argentoraton 1** or the **coordinate Urakok m.g.** The assignment to **the Argentoraton coordinate** is plausible. The 8th

¹⁰¹ STÜCKELBERGER / GRASSHOFF, Bd. 1: 213.

¹⁰² GREULE, ALBRECHT: 131.

¹⁰³ LOGEL, THIERRY, , Passages à gué sur le Rhin (Alsace/Bade) au haut Moyen Âge, in : Des Fleuves et des Hommes à l'Époque Mérovingienne, Dijon 2021 : p. 213-233. <https://books.openedition.org/artehis/24279>

Legion participated in Caesar's Gallic War and, according to the measurement points linked to **Argentoraton 1**, took part in the Battle of the Aisne, among other engagements.

Elkebos

Ἐλκεβος, ἑλκεβος

Elkebos

Measurement points

Basel, Bebelstrasse

Breisach, Josef-Bueb-Strasse

Elz - Flussquelle

Elzach, Alfing

Esch-sur-Alzette Rue de Belvaux

Fessenheim, Rheininsel

Genf, Rue du Vidollet

Heinrichswil, Haltenstrasse

Lago da Curnera (antike Rheinquelle)

Rottweil, Marxstrasse 1

Speyer, Oelhafen

Thun, zwischen Mühlebrücke und Rathausbrüggli

Zarten, Zartener Straße

The tribe known as the Τριβόκκων, Τριβόνων, Tribokon, or Tribonon—to which the coordinate Elkebos is assigned—is mentioned in Caesar's Commentaries on the Gallic War. He places them geographically between the Mediomatrici and the Treveri, and thus on the left bank of the Rhine in Gallia Belgica.

Analysis of the measurement points for the coordinate **Elkebos 2** reveals settlements on both the right and left banks of the Rhine. On the right bank, the measurement point is located in the town of **Elzach, Alfing**, with Gallic distance intervals, and at the measurement point of the **source of the Elz River**, with Greek distance intervals. On the left bank of the Rhine, a measurement point is located in the town of **Esch-sur-Alzette, Rue de Belvaux**. The clustering of the measurement points on the right bank of the Rhine clearly points to the Helvetian region.

The name Elkebos can be broken down into Greek: ἑλκεω – *to drag*; ἑλκετήρ – *something that pulls*. -Bos possibly from *bus, cattle*. The interpretation is thus *those who wander*, possibly with cattle.

Since Caesar makes no mention in his Commentaries of the abandonment of the settlement on the right bank of the Rhine, it can be assumed that the ethnic group continued to live partly on the right bank even after the Gallic War. The measurement point at **Esch-sur-Alzette, Rue**

de Belvaux, should be understood as a new settlement established under Roman influence, given its Greek connection to **Argentoraton 1** and **Kaisaromagos 2**. The measurement point lies very precisely at the intersection of several streets in the present-day town; the importance of a road connection would have played a role very early on.

Tarodounon

Ταρόδουνον, Ταρούδωνον
Tarodounon, Taroudonon

Measurement points
Augst, Römisches Theater
Brebotte
Breisach, Josef-Bueb-Strasse
Elzach, Alfing
Elzquelle - Bregquelle Uebergang
Heinrichswil, Haltenstrasse
Lausanne, Camping Vidy
Öhningen, Oberdorfstraße
Speyer, Oelhafen
Vesoul, La Motte
Vesoul, Place de l'Eglise
Zarten, Zartener Straße

The measurement point that gives the name is certainly **Zarten, Zartener Straße**. The measurement point is located near the Late Celtic settlement of Tarodunum, confirmed by excavations, which is dated to 150 BC to 80 BC.

Argentoouaria

Ἀργεντοουαρία, Ἀργεντουαρία
Argentoouaria

Measurement points
Breisach, Josef-Bueb-Strasse
Bribir, Kiceri
Doubs Source 1
Doubs Source 2
Elzquelle - Bregquelle Uebergang
Fessenheim, Rheininsel
Kembs - Schaeferhof, zwischen Rhein und Rheinseitenkanal
Lyon Confluence, Place Nautique

Mainz Kastel im Rhein
Melchsee, Quellgebiet Sarner Aa
Speyer, Grosse Gailergasse
Tanger Flussquelle
Traben, Am Neuberg
Vesoul, Place de l'Eglise
Zarten, Zartener Straße
Zarten, Zartener Straße

The coordinate **Argentoouaria**, with its measurement points, indicates supraregional exchange extending as far as present-day Lyon, into Central Switzerland, and to Croatia (Bribir). The measurement points used to locate Argentoouaria are **Fessenheim – Rheininsel** and **Kembs – Schaeferhof**, both situated directly on the Rhine.

A number of coordinates contain a designation ending in -ouaria. -Ou- is the locative prefix meaning *where*, followed by -aria. According to Herodotus¹⁰⁴, the ancient name of the Medes was Ἀριοι, *Aryans*. The latter part of the coordinate notation refers to places of the Aryans or Medes. This is supported by the linking of the measurement points **Fessenheim – Rheininsel** and **Kembs – Schaeferhof** with the coordinate **Ouarouaria 1** (measurement point **Bribir Kiceri**), which likewise bears the name element -ouaria.

Augousta Raurik 1,2

Ραυρικῶν Αύγουστα, Αυγούστα ραυρικ
Raurikon Augousta, Augousta Raurik

Measurement points

Augst, Römisches Theater
Basel, Bebelstrasse
Brebotte
Bregquelle
Breisach, Josef-Bueb-Strasse
Elzach, Alfing
Elzquelle - Bregquelle Uebergang
Genf, Rue du Vidollet
Heinrichswil, Haltenstrasse
Rottweil, Marxstrasse 1
Surenenpass (Übergang von der Reussebene zum Hochtal Engelberg) westlich, auch Quellgebiet der Engelberger Aa. Bis 25 Meter Abweichung von Messpunkt
Thun, zwischen Mühlebrücke und Rathausbrüggli
Weiherkopf und Passhöhe
Zarten, Zartener Straße

¹⁰⁴ HERODOTUS, Historien, 7,62. Griechisch-deutsch, hrsg. v. Josef Feix, 2 Bände, Düsseldorf 2001: 927.

The measurement points for **Raurikon Augousta 1,2** are **Augst, Roman Theater**, and for **Augousta Raurikon 2, Basel Bebelstrasse**. The measurement point at the Roman Theater in **Augst** suggests a later addition to the coordinate system, possibly not until the Roman Imperial period. A similar late addition is also assumed for the **Basel, Bebelstrasse** measurement point.

Several other measurement points north and east of the Rhine point to the area of the southern Black Forest between **Rottweil** and **Hüfingen** in the east and the Rhine, which then flows northward to **Breisach** in the west.

The name can be broken down into *Ra-uri-kon*. *Ra-*, *Ru-*, is certainly to be read as a synonym for river. **Augousta Raurik 2** is linked to the **Surenen Pass measurement point**, the transition from the Reuss Plain to the high valley of Engelberg, which is also the headwaters of the Engelberger Aa. The area is associated with the present-day Swiss canton of Uri. A connection between the morpheme *-uri-* and the modern canton of Uri is possible. Overall, the interpretation as *river coming from Uri* or *river of the Urians* is highly plausible. This interpretation is further supported by the measurement points of the **Argentoouaria coordinate**.

Helvetians

Ganodouron

Γανοδουρον, Γαννόδουρον, Προδεντια
Ganodouron, Gannodouron, Prodentia

Measurement points

Augst, Römisches Theater

Bodman, Altbodman

Cham, Luitpoldhöhe

Colm la Runga 1 Roemerlager

Elz - Flussquelle

Esch-sur-Alzette Rue de Belvaux

Genf, Rue du Vidollet

Genf, Rue de la Croix Rouge

Graffenstaden, Rue du Commerce, Embouchure de l'Ehn

Grimseesee Quellgebiet Aare, Übergang Rottental

Hagendorn bei Cham (Schweiz)

Heinrichswil, Dorfstrasse

Heinrichswil, Haltenstrasse

Les Rousses Uebergang L'Orbe zu La Bienne

Melchsee, Quellgebiet Sarner Aa

Rubenheim

Sarre Rouge, Source

Speyer, Oelhafen

Strasbourg, Chemin de Gliesberg, Embouchure de la Bruche

Strasbourg, Quai Jacques Sturm

Surenepass (Übergang von der Reussebene zum Hochtal Engelberg) östlich, auch Quellgebiet mit Zufluss zur Reuss.

Thun, zwischen Mühlebrücke und Rathausbrüggli

The heading in the coordinate descriptions makes it clear that **Ganodouron** is a polis of the *Elouetioi*, the Helvetii. The measurement points for this coordinate geographically cover an area stretching from the Oberpfalz in eastern Bavaria to Geneva in the southwest. The Central Alps lie in between. To the west, measurement points extend as far as the Rhine and on to the Saar.

Linguistically, *Γα-*, *Ga-*, is not immediately transparent. It does not appear frequently in the coordinates. LIDDELL places *Γαμ-* and *Γεν-* side by side with the root *Γένω*, corresponding to Sanskrit *gan*, *γενος* *gens*, and others. *Γαμος*, *wedding*, with the underlying meaning of entering into a union¹⁰⁵. *Gam-* or *Gan-* is thus to be understood as an expression for *people*, *ethnos*.

¹⁰⁵ LIDDELL: 308.

The Oberpfalz, with the coordinate **Prodentia / Brodeltion**, is described as the starting point of the Helvetii's movement described as Ganodouron. Προδεντια, Prodentia, is to be read as the Greek Προγεντια, Progentia, meaning the previous location of the Helvetii or, in a broader sense, *the place* of the Helvetii's *ancestors*. The connection between Prodentia and the Helvetii arises from the linking of coordinates and measurement points.

In the Oberpfalz, a measurement point from **Ganodouron 1** is located near the town **of Cham** on an elevation known as **Luitpoldhöhe**. This point is to be understood as one of the previous locations of the Helvetii.

A major settlement of the Helvetii must have been located near the towns of Cham and Hagendorn in the Swiss canton of Zug; the **Hagendorn site near Cham** corresponds to **Ganodouron 1,2** to **Foros Tiberiou**, and also to the location **Prodentia**.

The result of the Helvetii's exodus from the Alpine region toward the southwest, as described by Caesar, must be understood in a nuanced way based on the coordinates. The measurement point **Geneva, Rue de la Croix Rouge**, aligns with **Ganodouron 1,2**, **Foros Tiberiou**, **Prodentia**, and **Kaisaromago 2** via distance intervals. According to this interpretation, Caesar settled the remaining Helvetii at the site of present-day Geneva and south of the Rhône.

Another measurement point, **Geneva Rue du Vidollet**, together with two other points approximately 500 meters away, depicts an event described in Caesar's Commentaries on the Gallic War. The Helvetii and their allies expected Caesar to allow them to pass through Roman territory. See the entry under *Geography in the Service of Military Commanders*.

Foros Tiberiou

Φόρος Τιβερίου, Φόρο Τίβεριο
Foros Tiberiou

Measurement points

Balivaux pres de Vouglans (L'Ain)
Colm la Runga 1 Roemerlager
Colm la Runga 2 Roemerlager
Elzach, Alfing
Genf, Rue de la Croix Rouge
Grimsensee Quellgebiet Aare, Übergang Rottental
Hagendorn bei Cham (Schweiz)
Konstein, Grabengasse
Lago da Curnera (antike Rheinquelle)
Les Rousses Uebergang L'Orbe zu La Bienne
Rhône Gletscher

**Surenenpass (Übergang von der Reussebene zum Hochtal Engelberg) westlich, auch Quellgebiet der Engelberger Aa. Bis 25 Meter Abweichung von Messpunkt Thun, zwischen Mühlebrücke und Rathausbrüggli
Valserhône, Pont du Tram, traversée de la rivière La Valserine
Waffenbrunn, Muenchsbachsberg**

The coordinate links to measurement points that trace the route through the Swiss Central Alps. To the east, the coordinate links to the **sources of the Rhône, the Aare**, and the **Engelberger Aa**, a tributary of the Reuss. Along the course of the Aare, the coordinate links to a measurement point in the town of Thun, where the Aare flows into Lake Thun. On the western side of Lake Geneva and in the Jura Mountains, additional measurement points are located in **Geneva, Valserhône**, and **Les Rousses**.

Using Gallic distance intervals, the coordinate links to measurement points north of the Danube, **Waffenbrunn**, and **Konstein**—an area with which the Helvetii maintained close ties and where the area where the Helvetii's ancestors lived is located, identified by the coordinate **Prodentia**.

The name of **the coordinate** is **Foros Tiberiou**; **Foros** is the dialectal form of πόρος, **Poros**. The Greek π has become φ here, analogous to **Froidios** and **Fagaron**. This sound shift should be viewed in parallel with the First Germanic Sound Shift. Gr. **Poros**, dt. *Weg, Passage*, literally “the *path of Tiberius*.” Beyond its literal meaning, it serves as a roadmap through the Swiss Central Alps. Further measurement points for **Foros Tiberiou** are expected.

Lower Saxony and Westphalia

Amasiou-Mündung 1

Αμασίου ποτὺς ἐκβολ
Amasiou Muendung

Measurement points
Bohmte, Ovelgoenne
Bomlitz, Am Hoop
Ems-Muendung bei Pogum
Riepe bei Ihlow
Soltau Friedrichseck Grosse Aue
Thuine Hauptstrasse

The Ems estuary, corresponding to the link with the **Ems estuary** measurement point **near Pogum**. The variant from Cod. Vat. Gr. 191 has not yet been evaluated.

Riepe measuring point near Ihlow

Measurement point
Riepe bei Ihlow

The **Riepe near Ihlow measurement point** is located north of the village of Riepe and about 350 meters southwest of the course of the Ems-Jade Canal. With links to the coordinates **Ikosion** in North Africa, **Londinion in Britain**, **Samarobrioua 1** in the **Pas-de-Calais** region, as well as to the mouth of the Ems (coordinate **Amasiou-Muendung 1**) and the **mouth of the Meuse**, the **Riepe bei Ihlow** measurement point is clearly characterized by long-distance trade.

Ouisourigios 1,2

Ουῖσουρίγιος ποτὺ ἐκβολ Ουῖσουργ[] ποτ[]
Ouisourigios Flussmündung, Quellen des Flusses
Weser (Fluss)

Measurement points for the Ouisourigios sources

Braunschweig Marstall
Brunsbuettel, Einfahrt NOK
Hannoversch Münden, Wallstraße
Oberdorla, Bahnhofstrasse - Opfermoor
Poritz an der Milde
Quedlinburg, Basilika St. Wiperti
Schwagstorf, Zum Kronensee II
Söse antike Mündung
Söse Quelle

Messpunkte zu den Ouisourigios-Mündungen

Asemissen
Brunsbuettel, Einfahrt NOK
Hannoversch Münden, Wallstraße
Kleve, Emmericher Strasse
Mellum 1
Mellum 2
Neuwerk
Söse antike Mündung

The name of today's Weser River is **Ouisourigios** in the coordinate designations. Its source was already located in antiquity at the confluence of today's Fulda and Werra rivers near Hannoversch Münden (measurement point **Hannoversch Münden, Wallstraße**). The mouth of the Ouisourigios must have been located in antiquity near today's Mellum Island (measurement points **Mellum 1, 2**). Access to the river was significant for long-distance travel; the coordinates **Germiana 2** (Constantine in Algeria) and **Froidios Muendung 2** (French Channel coast south of Calais) are linked to the **Mellum 2** measurement point.

The **Söse River**, which originates at the Steinkopf summit in the Upper Harz, is also referred to as the **Ouisourigios**. The measurement point **Söse Quelle** at the Steinkopf summit indicates the source of the Söse, while the measurement point **Söse antike Muendung** marks the point where the ancient Ouisourigios had its mouth—this follows from the linkage of the coordinate **Ouisourigios Muendung 2** with the Greek distance interval 18.1666 (today the approximate location of the Rhume's mouth into the Leine—see also the entries **Förste am Harz 1** and **Förste am Harz 2** regarding the Söse).

The name Ouisourigios contains the locative prefix *Ou-* or *Ou-i-*, meaning *where... is*, followed by *-i-sourigios* or *-sourigios*. It is likely that *-sou-* / *-su-* should be understood to mean *valley* or *depression*, if we are to follow PELLEGRIN's note¹⁰⁶. The suffix *-rigios* is Latin and should be read as an adjective, with the Latin root *-rig-*, meaning *wet* or *to make wet*¹⁰⁷, and the Greek *ῥοχ*. This interpretation is confirmed by the Greek *ούρω*, *suro*, meaning *to flow down, to carry down*. A semantic connection with the Greek *συριγγίας*, *surigias*, meaning *reed*, is also possible. The meaning of *Ouisourigios* is therefore *where the river is* or *where the reed river is*.

¹⁰⁶ PELLEGRIN: 67.

¹⁰⁷ HALSEY, CHARLES, *An Etymology of Latin and Greek*, Boston 1889: 75.

Ouisourigios is the Greek form of the river name; the Low German form in the 8th and 9th centuries was *Wisera*, from which the modern river name *Weser* is derived¹⁰⁸. The Low German *Wisera*, derived from the Old High German, ultimately contains *-ra-*, a common designation for *a river*, which appears in coordinate descriptions as *-ra-* and *-ru-*. The Low German *-se-* may go back to an ancient *-su-*¹⁰⁹.

Tatorion

Τατόριον (2)

Tatorion (2)

Algier, Rue Hadj Omar

Alt-Sternberg Steinberg

Asemissen

Bomlitz, Am Hoop

Ems-Muendung bei Pogum

Hannoversch Münden, Wallstraße

Kassel, Hafenstrasse

Leerdam, Allg. Begraafplaats

Loon-Plage, Rue du Moulin

Muenster Hauptbahnhof

Neuwerk

Thuine Hauptstrasse

Uphusen, Zum Uphuser Meer

Wasserkuppe, Fuldaquelle

The letters in Cod. Vat. Gr. 191 between two *t*'s are difficult to read. A comparison of the spelling with other passages in the manuscript, including *Lakoi*, suggests that the variant *tat-* is the most likely. CUNTZ had read the passage as *Teut-*, which is unsatisfactory, since the spellings of the Greek letters *e* and *u* differ in the manuscript.

If a *krasis* is present, a reading of *Ta-tor-rion* is possible, meaning *where the river mouth is* or, linguistically smoothed, *the location of the river mouth*. The designation should thus refer to the ancient **Ems-Muendung** near the present-day town **of Pogum**, where a measurement point is located, and to the measurement point of **the ancient mouth of the Elbe** near **Neuwerk**.

Tatorion and **Taderion** do not represent variants of a single coordinate, as the middle elements *-tor-* and *-deri-* have different etymological origins.

The measurement point **Uphusen, zum Uphuser Meer**, located southwest of today's Ems-Jade Canal, belongs to a later layer of coordinates. Links to North Africa (coordinate **Ikosion**) and Pas-de-Calais (**Samarobrioua 2**) indicate a long-distance trading center; there are also

¹⁰⁸ GREULE: 586.

¹⁰⁹ GREULE: 586.

connections to the IJssel and the lower Ems (based on links with the coordinates **Renos oestliche Muendung 1**, **Nabalia 1,2** and **Tatorion 2**).

The **Münster Central Station** measurement point belongs to a later layer in the coordinate system. This is indicated by a lower precision at the intersection of the distance intervals (up to 25 meters), which is a consequence of its insertion into an already largely existing system. The location of the measurement point in the center of today's city of Münster also points to uninterrupted settlement continuity and supports the conclusion of its late integration into the coordinate system. The **Münster Hauptbahnhof** measurement point exhibits characteristics of supraregional contacts (linking to the **Londinion** coordinate).

Taderion

Ταδερίον (1)
Taderion (1)

Measurement Points

See Geography in the Service of Military Commanders

The coordinate Taderion 1 becomes clearer when broken down into Τα-δερί-ον (Ta-deri-on), with -deri- translated as δῆρις, meaning *battle* or *fight*. Taderion is one of the coordinates that mark one of the two measurement points in Schwagstorf, Zum Kronensee. *Ta-* is a locative prefix meaning *there*. In essence, the translation of Taderion is *battle site*.

Mounition

Μουνιτιον Μουνιτιόν
Mounition

Measurement points

Altenbergen Lange Straße
Aschersleben Düstere Tor
Bad Lippspringe Quelle der Lippe
Bad Salzuflen Wuestener Strasse
Braunschweig Marstall
Braunschweig Neue Strasse
Foerste 2 am Harz
Hottendorf Laugebachquelle greek Dist.
Huppigsberg am Mühlingsbach bei Schwelentrup
Montreuil-sur-Mer Rue de l'Eglise
Outreau Rue d'Outreau
Riepe bei Ihlow

Senne Haustenbecker Straße
Söse Quelle
Sparrenberger Egge Wachturm
Werben a.d. Elbe
Westerschelde vor Cadzand
Winsen / Luhe Marktstrasse

Altenbergen Lange Straße

The measurement point for the coordinate **Mounition** is **Altenbergen Lange Strasse**. When broken down, **Moun-iti-on** is associated with the **Itii**, an ethnic group with a settlement area in today's Pas-de-Calais department (for the Itii, see the entries **Froidios Pot** and **Ition Akron**). This follows from the linguistic context and from the linking of the measurement point **Altenbergen Lange Strasse** with the coordinates **Ition Akron 1,2** and **Froidios Mündung 1,2**, as well as from the linking of the measurement points **Montreuil-sur-Mer Rue de l'Eglise** and **Outreau Rue d'Outreau** with the coordinate **Mounition**.

The coordinates were also used in connection with the Roman campaigns in Germania. For example, the Itii, as allies of the Romans, took part in the battles at the Söse and in Braunschweig. Similarly, at the Roman camp at **Sparrenberger Egge**, the elevation of over 200 meters is associated with a Roman watchtower. The measurement point **Bad Salzuflen Wuestener Strasse** may likewise belong to a Roman camp. If the name is related to Roman military installations, the prefix *Moun-* can be interpreted as deriving from the Latin *munio*, meaning *to fortify or reinforce*.

Stereontion Streontion

ΣΤΕΡΕΟΝΤΙΟΝ ΣΤΡΕΟΝΤΙΟΝ
Stereontion, Streontion

Measurement points
Alt-Sternberg Steinberg
Amoeneburg, Stiftskirche
Annaba, Rond Point Joannonville
Bad Wünnenberg
Bödefeld, Zur Wahr
Braunschweig Marstall
Brilon, Fluss Aa beim Zufluss der Flüsenbecke.
Foerste 1 am Harz
Fritzlar, Rosenturm
Goettingen, Jheringstrasse
Hedemünden, Römerlager
Höngeda, 1,7 km westlich vom heutigen Ort
Kassel, Hafenstrasse

Metze, Gartenstrasse
Schlitz, Grabenberg
Schwagstorf, Zum Kronensee II
Senne, Haustenbecker Straße
Sidi Bellatar, am Fluss Chelif
Siegquelle Rothaarsteig
Söse antike Mündung
Söse Quelle
Stedere Ziegeleiweg bei Gehrden
Stedorf, Stubbenkamp
Steterburg, Thiede
Ulrichsecke und Hattenberg beim Ort Niederaula an der Fulda
Wasserkuppe, Fuldaquelle
Weimar bei Marburg
Wiesbaden, Schuetzenhofquelle
Winsen / Luhe Marktstrasse

The **Stereontion** coordinate covers a large region with measurement points stretching from the Aller River in the north to southern Hesse. The prefix *Ste-* in the measurement points **Alt-Sternberg Steinberg**, **Stedere Ziegelweg near Gehrden**, **Steterburg Thiede**, and **Stedorf Stubbenkamp** indicates that these are the measurement points that give the system its name.

The coordinate names **Stereontion** and **Streontion** may derive from the Greek forms στρηνος *strenos*, meaning *power* or *strength*, and στερέωσις, *stereosis*, στερέωμα, *stereoma*, meaning *firm*, *solid*, *confirmation*, or *foundation*. The forms mentioned by POKORNY related to *ster-*, meaning *rigid*, *stiff* or *reluctant*, follow a similar line of thought¹¹⁰. Thus, the coordinate names refer to the significance of the locations during the Roman campaigns in Germania.

UDOLPH believes that place names beginning with *Ster-* most likely derive from the semantic field of *Stadt* and *Stätte*¹¹¹. Since a shift in meaning over time is to be expected, this does not rule out older meanings.

Measurement Point Alt-Sternberg Steinberg

About 1,6 kilometers southwest of Steinberg lies the measurement point **Huppigsberg on the Mühlingsbach**, with the coordinates **Bonna 1**, **Traine 1**, and **Nauaision 1** (from Cod. Vat. Gr. 177) as well as the coordinate **Mounition**. The measurement point **Alt-Sternberg Steinberg**, located on the mountain to the northeast, is calculated using coordinates from Cod. Vat. Gr. 191: **Tatorion 2**, **Amisias 2**, **Streontion 2**.

¹¹⁰ POKORNY, Bd. 2: 627–633.

¹¹¹ UDOLPH, JÜRGEN, *Namenkundliche Studien zum Germanenproblem*, Berlin New York 1994: 193.

This configuration may represent a Roman military operation in which the Roman units were positioned south of the stream. A connection between the two measurement points presupposes that, at the time the Roman campaigns in Germania were recorded in the coordinates, there had not yet been a separation into the different recensions to which Cod. Vat. Gr. 177 and Cod. Vat. Gr. 191 belong.

Gehrden measurement point

The measurement point corresponds to the coordinates **Stereontion 1,2**. The **Gehrden Ziegeleiweg** measurement point is also linked to the coordinate **Germiana 1** in North Africa and the coordinate **Froidios Mündung 1**, suggesting a connection across the Atlantic to North Africa.

Based on this connection, the initial sound "*Gehr-*" in Gehrden can be traced back to the North African *Ger-* in *Germiana*. Thanks to KUHN's research, we are relatively well-informed about the pre-Germanic environment surrounding the town of Gehrden. Gehrden, with its castle hill, and the surrounding towns

"Leveste (just over 2 km from the castle) and the deserted Lamesten, plus Ditterke (Thittereke), Göxe (Gakesse), Goltern (Golturke), Gümmer (Gummere), Letter (Lettere), Luth (Lute), Seelze (Sellese), and the abandoned settlements of Ewip, Elesze (probably from *Alik), Spere (close to the castle), and Stedere"¹¹²

are characterized by archaic, pre-Germanic names.

Measurement point Braunschweig Marstall

See under *Geography in the Service of Military Commanders*.

¹¹² KUHN, HANS: 35.

Eastern North Rhine-Westphalia, Hesse, and western Saxony-Anhalt

Bogadion

Βογάδιον, Βογαδιῶν
Bogadion

Measurement points
Asterlagen Rheinhausen
Bad Wünnenberg
Bödefeld, Zur Wahr
Brilon Fluss Aa beim Zufluss der Flüsenbecke
Katzenelnbogen Römerberg
Marsberg Weist
Schwagstorf Zum Kronensee II

The measurement points for Bogadion cover an area between the measurement points **Bödefeld Zur Wahr**, and **Bad Wünnenberg**—that is, the northern part of the Rothaar Mountains, including the headwaters of the Ruhr and Diemel rivers.

Mattiakon

Mattiakon
Mattiakon

Measurement points
Bödefeld Zur Wahr
Eisenach, Georg-Eucken-Straße
Frankfurt Braubachstrasse 24
Goettingen Jheringstrasse
Heidelberg auf dem Heiligenberg
Lahnstein Mündung der Lahn
Mainz Grosse Langgasse
Metze Gartenstrasse
Speyer Oelhafen
Weimar bei Marburg
Wieseck Kesslerstrasse
Wiesbaden Schuetzenhofquelle

The coordinate **Mattiakon** is usually associated with the place name Mattium, which the Roman writer Tacitus mentions in his Annals¹¹³. Kuhn posits that Mattium was located not far from the town of Metze in northern Hesse, where the name is said to have been partially preserved¹¹⁴. It turns out that the measurement point **Metze Gartenstrasse**, when measured using a Greek distance interval, corresponds to the coordinate **Mattiakon**. The place name Metze and the name of the local river Matzoff can thus be linked to the ancient designation Mattiakon, confirming KUHN's assumption.

Furthermore, measurement points for **Mattiakon** correspond twice to place names containing the element *Wies-*; these are the measurement points **Wieseck Kesslerstrasse** and **Wiesbaden Schützenhofquelle**. *Wies-* and *Matti-* are to be understood as synonyms; *Matte* is still used in German-speaking Switzerland today. The etymology points to great antiquity and widespread distribution. However, a Greek etymology does not apply to *Matti-*.¹¹⁵

The morpheme *-mat-* is also found in the as-yet-unlocated Ανδομάτονύον, Andomatonuon, of the Loggonas and in the name of the ethnic group μεδιοματρικες, Mediomatrikes, from whose name the name of the city of Metz in France is derived. In northern France, *-mat-* evolved into *Metz*; in the case of Mattiakon in northern Hesse, *Matti-* evolved into *Metze*.

Wiesbaden Schützenhofquelle measurement point: The spring is located 50 meters from the measurement point. This point is linked via Greek distance intervals to the coordinates **Bonna 1** and **Ouetorra 1**, and thus has a clear connection to the areas on the left bank of the Rhine—the Roman territories. The **Wieseck Kesslerstrasse** measurement point links not only to coordinates on the right bank of the Rhine but also to the **Bonna 2** coordinate on the left bank. The Greek distance intervals from **Bonna 2** have typically been used to depict Roman military operations. The town of Wieseck is thus portrayed as an actor on Rome's side or as a target of Roman military operations.

Göttingen Jheringstrasse and Weimar near Marburg

The two measurement points are linked via a distance interval to **Mattiakon** but have no connection to the area on the left bank of the Rhine or to Roman military operations. The measurement point in **Weimar near Marburg** is calculated using coordinates from Cod. Vat. Gr. 177, while the **Göttingen Jheringstrasse measurement point** is based on Cod. Vat. Gr. 191. Regionally, both measurement points refer to coordinates that in turn trace back to measurement points in eastern North Rhine-Westphalia, Hesse, and western Saxony-Anhalt.

¹¹³ TACITUS ANNALS, 1,56.

¹¹⁴ KUHN, HANS, Vor- und Frühgermanische Ortsnamen in Norddeutschland und den Niederlanden, in Westfälische Forschungen 12, Münster 1959: 34.

¹¹⁵ See also under *Place names in several languages with similar meanings*.

Fritzlar measurement point

Measurement point

Fritzlar, Rosenturm

The **Fritzlar Rosenturm** measurement point must have had a sacred significance. The measurement point is calculated using coordinates from Cod. Vat. Gr. 191, **Stereontion 2, Amaseia 2, Nauaision 2, and Kandouon 2**. The regional assignment is thus eastern North Rhine-Westphalia, Hesse, and western Saxony-Anhalt. The sacred assignment is derived from the distance interval of 36,75 to **Dourokottoron**.

Amaseia 1,2

Amaseia Amisias

Amaseia Amisias

Measurement points

Alt-Sternberg Steinberg

Asemissen

Bödefeld Zur Wahr

Brilon Fluss Aa beim Zufluss der Flüsenbecke.

Eichstaett Diözesanarchiv

Eisenach Georg-Eucken-Straße

Emse-Quelle

Foerste 1 am Harz

Fritzlar Rosenturm

Goettingen Jheringstrasse

Gross-Gerau An der Roemerbruecke

Katzenelnbogen Römerberg

Mainz Zollhafenbrücke

Marsberg Weist

Muenster Hauptbahnhof

Muldenberg Übergang über die Zwickauer Mulde

Oberdorla Bahnhofstrasse - Opfermoor

Quedlinburg Basilika St. Wiperti

Radenhausen bei Amoeneburg

Remse bei Waldenburg August-Bebel-Straße

Ruwer Ruwer mündung

Schlitz Grabenberg

Schwagstorf Zum Kronensee I

Senne Haustenbecker Straße

Siegquelle Rothaarsteig

Söse antike Mündung

Stedere Ziegeleiweg bei Gehrden

Ulrichsecke und Hattenberg beim Ort Niederaula an der Fulda
Weimar bei Marburg
Wieseck Kesslerstrasse
Wien Stubenring

Based on place names linked to the coordinates via distance intervals, the distribution of the coordinate name can be traced from the town of Asemissen (Detmold administrative district, eastern North Rhine-Westphalia) in the west to the town of Remse (Saxony) in the east. The rivers Ems and the source of the Emse are also linked. A concentration of locations lies in present-day Hesse. A connection to the name Amöneburg in Hesse may also exist.

The widespread distribution from west to east points to power and influence associated with Amaseia and Amisias. This may have resulted from mining at Obermarsberg; see below.

Measurement point
Marsberg Weist

The **Marsberg Weist** measurement point is linked via distance intervals to the coordinates **Amaseia 1, Amas[] Quellen, Bogadion, Kandouon 1, Menosgada**. The measurement point is located near the banks of the Diemel River and not far from the Obermarsberg, an area with mining activity. Mining rights belonged to Corvey Abbey from the mid-12th century onward. A document mentions

“...gold, copper, lead, and tin...”

which, among other things, were permitted to be mined¹¹⁶. Copper was the last metal to be mined.

Etymology: The name of the river is Αμασίου ποταμός εκβολή or Άμας ποταμός εκβολή, Amasiou or Amas; the name of the place is Αμάσεια or Αμισηάς, Amaseia or Amisias. The prefix A- may be a locative prefix meaning *where... is*. The suffix is *-seia* or *-sia*. Σία is the Laconic variant of the Greek Τεία, *Theia*, who, according to Greek mythology, is the daughter of Gaia and Uranus. Theia is one of the twelve Titans and the goddess of gemstones and gold, because both derive their great value from her¹¹⁷. The naming after *Sia* or *Theia* is likely connected to mining activities that took place as early as antiquity. The meaning of *-ma-* or *-mi-* is unclear; it likely refers to a characteristic of the goddess. The meaning is therefore *where the goddess Sia is*.

The interpretation as a female deity is supported if the initial element *Ama-* is interpreted as *mother* (POKORNY¹¹⁸), which offers an alternative to a locative prefix at the beginning. In this case, the interpretation is *Mother Sia*.

¹¹⁶ Cited from: Kilianstollen, Bergbau und Geologie in Marsberg, hrsg. vom Marsberger Heimatbund e.V., 3. Auflage 2007: 3.

¹¹⁷ DALY, KATHLEEN N. and RENGEL, MARIAN, Greek and Roman Mythology A-Z, 3rd ed., New York, 2009: 139.

¹¹⁸ POKORNY I: 53.

Measurement point

Brilon, confluence of the Fülßenbecke and the Aa

The measurement point links the distance interval Greek 8 with the **coordinate Amaseia 1**. A connection to lead mining in the Brilon area is possible. To the west, less than a kilometer away in the Fülßenbecke valley, there was an Imperial-era settlement site with finds related to lead processing.

Fagaron Feugaron

Φάγαρον, φεύγαρον

Fagaron, Feugaron

Measurement points

Bad Wünnenberg

Brockengipfel

Eisenach Georg-Eucken-Straße

Emse-Quelle

Höngeda 1,7 km westlich vom heutigen Ort

Metze Gartenstrasse

Oberdorla Bahnhofstrasse - Opfermoor

Söse antike Mündung

Wasserkuppe Fuldaquelle

Based on the **Brockengipfel** measurement point, the name Feugaron is likely related to the Greek φευγω, meaning “to flee.” The Brockengipfel is thus described as a place of refuge or protection. LIDDELL cites the root φυγ, Latin fugio, Gothic biuga, Slavic bega¹¹⁹.

For Fagaron, an interpretation based on the **measurement points Fulda source** and **Emse source** is plausible; Faga- is a variant of Doric παγά, Greek πηγή, German Quelle. The transition from Π to φ is also found in **Froidios** and others.

Fagaron cannot refer to the Brocken summit, since there is no spring area at the summit, and conversely, no places of refuge or shelter can be identified in the two spring areas. Feugaron from Cod. Vat. Gr. 191 and Fagaron from Cod. Vat. Gr. 177 must therefore refer to different coordinates.

¹¹⁹ LIDDELL: 1748.

Kandouon 1,2

Κανδουον Καύδουον

Kandouon Kaudouon

Measurement points

Amoeneburg Stiftskirche

Bismark

Brockengipfel

Emse-Quelle

Foerste 1 am Harz

Fritzlar Rosenturm

Goettingen Jheringstrasse

Höngeda 1,7 km westlich vom heutigen Ort

Katzenelnbogen Römerberg

Konstein Grabengasse

Leubingen Fuerstenhuegel

Magdeburg Grosser Werder

Marsberg Weist

Oberdorla Bahnhofstrasse - Opfermoor

Quedlinburg Basilika St. Wiperti

Tanger Flussquelle

Weimar bei Marburg

Wieseck Kesslerstrasse

The **Oberdorla Bahnhofstrasse** measurement point in the town of Oberdorla refers to the nearby Opfermoor.

The name can be broken down as *Kan-douon*: The first element, Καν-, Kan-, stands for *tribe* in the sense of a community—an ethnos. The formation is the same as in Kantioibis (see the entry for Kantioibis). This is confirmed by the variant from Cod. Vat. Gr. 191, καυ-, kau-. Gr. Καυλος, a stem or shoot of a plant. The second part is derived from the Greek Δυω, duo, meaning to *sink, to submerge*. The meaning of the name is thus *the sunken tribe* or *the sunken people*, a concept of the afterlife that describes the Opfermoor in Oberdorla as a passage into the otherworld.

Artaunon 1,2

Ἄρταυνον, Ἀρταυνον

Artaunon

Measurement points

Auerbach Schloss

Bad Wimpfen 2 Neckar

Burk, Pilatusfeld
Darmstadt Zeughausstrasse
Dieburg bei A 26
Frankfurt Braubachstraße 23
Gross-Gerau An der Roemerbruecke
Heilsbronn Klostermühle
Mittelkalbach St. Sebastian
Speyer Binsfeld
Speyer Grosse Gailergasse

The name Artaunon can be broken down into *ar-taunon*, with *ar-* / *are-* interpreted as Celtic *in front of* ⁻¹²⁰. According to the authors cited by SCHEUNGRABER / GRÜNZWEIG, the meaning would thus be *in front of -taunon* or *in front of the Taunus*. Since coordinate names often represent a crasis, this breakdown is plausible. The measurement point at **Frankfurt Braubachstraße 23** supports this interpretation.

However, it is not certain that the ancient *-taunon* is identical to today's *Taunus*. It is possible that the crasis encompasses further parts of the designation and that a breakdown into *are-ta-a-unon* may exist, with a locative prefix *-ta-* in the middle. The measurement points in **Auerbach, Darmstadt, Groß-Gerau**, and **Dieburg** point more toward the Odenwald region, and *Auer-* may be based on an ancient *-a-unon*. In any case, the measurement points cover an area that largely corresponds to the later Roman civitas Auderiensium.

The measurement point **Auerbach Schloss** can be attributed to the campaigns on the right bank of the Rhine under the Flavian emperors, as the measurement point is linked to the coordinate **Bomoi Flavio**.

¹²⁰ SCHEUNGRABER / GRÜNZWEIG: 74.

Saxony-Anhalt, Thuringia, Saxony

Bikourgion 1,2

Βικούργιον, Βικούργιον
Bikourgion

Measurement points
Aschersleben, Düsteres Tor
Bismark
Brockengipfel
Ehrenfriedersdorf, Sauberg
Leubingen Fuerstenhuegel
Magdeburg Grosser Werder
Main Quelle des Weissen Mains
Masserberg Meistergrund
Masserberg, Werraquelle
Poritz an der Milde
Remse bei Waldenburg August-Bebel-Straße
Stulln Woelsendorf
Tanger Flussquelle
Vach / Mannhof
Werben Tauber Aland

The name can be derived from Bi-kourg-ion. *Bi-* is to be read as a locative prefix; the actual name is *-kourgion*.

The coordinates, together with the linked measurement points, cover a large region extending north to Aschersleben and south to the Main River, encompassing the present-day states of Saxony-Anhalt and Thuringia as well as western Saxony. Both variants are linked to the **Leubingen Fuerstenhuegel** measurement point, which apparently holds special significance. Equally significant is the Ehrenfriedersdorf Sauberg measurement point, which indicates mining activity at this site as far back as antiquity (for Sauberg, see the entry for **Menosgada**).

Maroboudon 1,2

Μαρόβουδον, Μαρόβονον
Maroboudon, Marobonon

Measurement points
Braunschweig Marstall

Brockengipfel
Ehrenfriedersdorf, Sauberg
Muldenberg, Übergang über die Zwickauer Mulde
Remse bei Waldenburg, August-Bebel-Straße
Waffenbrunn, Muenchsbachsberg

The coordinate is named after the Germanic prince Marbod¹²¹. Measurement points confirm that Marbod or his troops participated in the Battle of Braunschweig against the Romans. Otherwise, there are not yet sufficient measurement points available for this coordinate.

¹²¹ PATERCULUS: 2,108.

North of the Danube, with drainage to the north and along the Main River

Bomoi Flavio

Βωμοί φλανίο Βομοι Φλαυχῖοι

Bomoi Flavio

Altar of the Flavians

Measurement points

Auerbach Schloss

Bad Wimpfen 2 Neckar

Neckarquelle Schwenningen

Nürnberg, Uhlandstraße

Rottweil Marxstrasse 1

Wellheim Marktplatz

The translation is **Altar of the Flavians**, a Roman imperial dynasty that included the emperors Vespasian, Titus, and Domitian (69–96 AD). The **Altar of the Flavians** coordinate was used to depict Emperor Domitian's military victories east of the Rhine. It primarily depicts the conquest of the Neckar River, marked by the measurement points **Neckarquelle Schwenningen**, **Rottweil**, and **Bad Wimpfen**, supplemented by a victory in the Odenwald region marked by the measurement point **Auerbach Castle**. **Wellheim Market Square** is a **measurement point** further east and north of the Danube.

Lokoriton

Λοκόριτον, Λοκόριτον

Lokoriton

Measurement points

Auerbach Schloss

Augsburg Jakoberwall

Bruchberggipfel, Quelle der Oker

Burk Pilatusfeld

Dieburg bei A 26

Eisenach Georg-Eucken-Straße

Finsterlohr Keltenwall

Gauaschach Sebastiansstrasse

Gross-Gerau An der Roemerbruecke

Lohr am Main Kapuzinergasse

Nürnberg Uhlandstraße

The measurement point that gives the coordinate its name is located in **Lohr am Main, Kapuzinergasse**. The prefixes *Lo-* and *Ko-* may refer to the small rivers Lohr and Kaibach, between which the town of Lohr lies. According to the dictionary by SCHEUNGRABER / GRÜNZWEIG, *-rito-* is Celtic, meaning a ford across the river; here, this likely refers to the Main River, on which the town of Lohr is situated¹²². Another possible location is a Celtic settlement near the town of Finsterlohr.

Segodonon

Σεγόδονον Σεγόδονον
Segodonon

Measurement points
Auerbach Schloss
Bad Wimpfen 2 Neckar
Burk Pilatusfeld
Cham Luitpoldhöhe
Eichstaett Diözesanarchiv
Eisenach Georg-Eucken-Straße
Gauaschach Sebastiansstrasse
Genf Rue du Vidollet
Koblenz Andernacher Strasse
Main Quelle des Weissen Mains
Nürnberg Uhlandstraße
Rottweil Marxstrasse 1

The measurement point that gave the river its name has not yet been located. As previous localizations indicate, it is likely to be found in the Neckar-Main region.

Melokabos 1,2

Μηλοκανοσ, Μελόκαβο
Melokanos, Melokabo

Measurement points
Bad Wimpfen 1 Corneliastrasse
Berching an der Sulz
Darmstadt Zeughausstrasse

¹²² SCHEUNGRABER / GRÜNZWEIG: 215.

Dieburg bei A 26
Eichstaett Mortuarium
Emse-Quelle
Glauberg bei Glauburg
Gross-Gerau An der Roemerbruecke
Hannoversch Münden, Wallstraße
Heilsbronn Klostermühle
Höngeda 1,7 km westlich vom heutigen Ort
Masserberg Meistergrund
Masserberg Werraquelle
Mittelkalbach St. Sebastian
Stulln Saeulnhof
Vach / Mannhof

The eponymous measurement point for the **Melokabo** coordinate is **Mittelkalbach, St. Sebastian**, near the Kalbach stream. The modern place name Mittelkalbach clearly reflects a folk etymological development of **Melokabo**.

The word element *-kalbach* preserves the term for *a calf*, a young animal. Assuming a *krasis*, the first element may be based on the Greek term for sheep, μήλον (*melon*). The meaning of the name must therefore likely be sought in an agricultural context.

Grauionarion

Γραυϊονάριον, Γαυονάρϊον
Grauionarion Gauonarion

Locations
Dieburg, bei A 26
Emse-Quelle
Gauaschach Sebastiansstrasse
Gauaschach noerdlich
Main Quelle des Weissen Mains
Mittelkalbach St. Sebastian
Thunimont
Vach / Mannhof

The unusual place name **Gauaschach** derives from the ancient **Grauionarion** or **Gauonarion**. The **Gauaschach** measurement point on **Sebastiansstrasse** is linked, via Gallic distance intervals, to the coordinates **Grauionarion**, **Laktron 2**, **Lokoriton**, **Menosgada**, **Segodonon**, **Toullon 1**, and **Taderion 1**. This indicates a Celtic-Greek settlement that must have had supraregional influence, as suggested by the connections to **Menosgada** and the Lakoi ethnic group. The designation from Cod. Vat. Gr. 177 derives from Γραικός, Graikos, Latin Graecus,

the ancient name for the *Greeks*. The place name thus means place of *the Greeks* or place of *the Greek-speaking people*.

The Celtic-Greek settlement faced off against Roman legions in battle. This is indicated by the link to the coordinate **Taderion 1**, which means *battlefield* (see also under *Geography in the Service of Military Commanders*). The **Gauaschach** measurement point to the north, about 1,3 kilometers northwest, marks the location of Roman troops. However, the battle did not bring an end to the continuity of settlement at this site, as the unusual modern name Gauaschach likely derives from the original Greek designations.

Dating the battle is difficult. The location of the Roman troops does not correspond to the **Altar of the Flavians**, so the event cannot have taken place during the Flavian reign. The Roman legion from Argentoraton 1 took part in the fighting. Cod. Vat. Gr. 177 does not specify a number for the legion, so there is no indication as to which legion from Argentoraton 1 - Strasbourg - participated in the battle.

Deouona

Δηούονα, Δεουόνα

Deouona

Measurement points

Bad Wimpfen 1 Corneliastrasse

Heilsbronn Klostermühle

The measurement point is located in the town of **Heilsbronn** near the Klostermühle on the Schwabach River (Middle Franconia). The town name Heilsbronn derives from a spring with sacred significance.

According to SCHEUNGRABER / GRÜNZWEIG¹²³, the coordinate designation **Deouona** is Celtic, with *Deou-* meaning *god* or *deity*. DELAMARRE considers *Deou-* to be Gallic and associates it with *deuos, god*¹²⁴. An interpretation from the Greek language is also possible, with **Deou-** derived from Δηώ, Deo, the goddess Demeter. The first element thus means *god* or *goddess* (*Demeter*).

The ending is *-ona* and, according to DELAMARRE¹²⁵, is well attested in Gallic as a suffix with a sacred meaning (e.g., Matrona, Epona). Here, a quality or attribute with a sacred meaning is to be expected in connection with *Deou-*. Gr. *-όναν, -onar*, meaning *dreaming in sleep, visions in sleep*, can be invoked. The location of the spring in Heilsbronn is thus, in Greek, the *place of*

¹²³ SCHEUNGRABER, CORINNA and GRÜNZWEIG, FRIEDRICH E. Die altgermanischen Toponyme sowie ungermanische Toponyme Germaniens. Ein Handbuch zu ihrer Etymologie. Hrsg. von Reichert, Hermann. Wien 2014. p. 148.

¹²⁴ DELAMARRE, XAVIER. Dictionnaire de la Langue Gauloise. Paris 2003: 142.

¹²⁵ DELAMARRE: 282.

the goddess (Demeter) who sleeps or dreams. The meaning would be the same in both Greek and Gaulish.

The sacred character of the spring site is thus attested to in multiple ways. Since a linguistic development from *Deouona* to *Heilsbronn* can likely be ruled out, the coordinate designation is either a foreign name or a partial linguistic and demographic shift occurred locally, during which awareness of the site's sacred significance was preserved.

Bergion

Βέργιον, Βεργιον
Bergion

Measurement points

Burk, Pilatusfeld

Heidelberg, auf dem Heiligenberg

Masserberg, Werraquelle

Stulln, Saeulnhof

Vach / Mannhof

Waffenbrunn, Muenchsbachsberg

The measurement point that gave the place its name is certainly located near the present-day town **of Burk**, on the Regnitz River.

Menosgada

Μηνοσγάδα Μεοσγάδα
Menosgada

Measurement points

Berching Schwimmbadweg

Burk Pilatusfeld

Ehrenfriedersdorf Sauberg

Gauaschach Sebastiansstrasse

Konstein Grabengasse

Main Quelle des Weissen Mains

Marsberg, Weist

Masserberg Meistergrund

Masserberg Werraquelle

Muldenberg Übergang über die Zwickauer Mulde

Stulln Woelsendorf

Vach / Mannhof

Waffenbrunn Muenchsbachsberg
Waffenrod Hauptstrasse
Wellheim Marktplatz

The etymology of **Menosgada** is associated with *weapons* and *war*, and this interpretation is supported by the names of the measurement points, such as **Waffenbrunn Muenchsbachsberg**, **Waffenrod Hauptstrasse**, and the source of the river named **Werra**—the early medieval form of the later French **guerre** and German **Krieg**.

Regarding the name: The first element *μηνος* is easily linked to the Greek *μένος*, meaning *strong, powerful*. *-γάδα* is derived from *the Sanskrit gada, a weapon*. The meaning is *powerful, strong weapons*. The name must refer to metal mining at the Ehrenfriedersdorf Sauberg measurement point; tin mining likely took place there as early as antiquity. MÜHLENHOFF did not recognize this; he dates the beginning of tin mining to around the 12th or 13th century AD (though he did not have any measurement points at his disposal).¹²⁶

The name Sauberg may be related to Sia, Seia—see the entry for *Amaseia*.

¹²⁶MÜHLENHOFF, KARL, *Deutsche Altertumskunde*, Bd. 1, Berlin 1870: 211.

North of the Danube, with drainage to the Danube

Source of the Danube, confluence of the first two rivers from Germania, confluence of the Aenus

Κεφαλή του ποτα
Head of the river

Measurement points

Bregquelle

Elzquelle - Bregquelle Uebergang

Grossmehring, Ludwigstrasse

Illerquelle bei Oberstorf (Zusammenfluss Trettach, Breitach und Stillach)

Öhningen, Oberdorfstraße

Stierenbach am Breitstock-Gipfel Bregquelle

The sources of the Danube River are designated as “head” in the coordinate descriptions. The **Danube head coordinate** is linked to the **Iller source** measurement point at **Oberstorf** and to the **Breg source** measurement point. The deviations are minor, approximately 160 meters from the Iller source and less than 20 meters from the Breg source. A link to the confluence of the Breg and Brigach near Donaueschingen—the current source of the Danube—cannot be established.

Danuvius measurement point – confluence of the first river from Germania

Measurement points

Bregquelle

Grossmehring, Ludwigstrasse

Illerquelle bei Oberstorf (Zusammenfluss Trettach, Breitach und Stillach)

Kelheim, Braeugraben

Lech, antike Flussmündung in die Donau

The coordinate links the measurement point **Großmehring, Ludwigstrasse**, with the measurement point **Kehlheim, Bräugraben**. At Großmehring, several streams from the area north of Ingolstadt flow into the Danube; the catchment area of these streams is local. Near Kelheim, the Altmühl River—or the modern Main-Danube Canal—flows into the Danube, covering a significantly larger catchment area north of the Danube River. The confluence of the Altmühl may represent the confluence of the first river from Germania into the Danube.

Danuvius – Confluence of the second river from Germania

Measurement points

Naab, Flussmündung in die Donau

Passau Klosterwinkel

The confluence of the second river from Germania is the confluence of the Naab River into the Danube.

Danuvius - Confluence of the Aenus River

Measurement points

Augsburg Jakoberwall

Illerquelle Oberstorf

Kelheim, Braeugraben

Naab, Flussmündung in die Donau

Passau Klosterwinkel

Waffenbrunn, Muenchsbachsberg

The measurement point for the coordinates of the **confluence of the Aenus** is **Passau, Klosterwinkel**.

Kantioibis

Καντιοιβίς, Καντιοεβίς,

Kantioibis

Measurement points

Beilngries Altmühl–Sulz crossing

Berching Schwimmbadweg

Eichstätt Mortuary

Konstein Grabengasse

Main Source of the White Main

Naab River mouth into the Danube

Waffenbrunn Muenchsbachsberg

Since dividing the word into *Kantio-* and *-ibis* does not yield a meaningful interpretation, a different approach is warranted. The ending *-ibis* is similar to the Latin inflectional ending *-ibus*. The ending in the nominative case is then *-is*; the noun is accordingly *Tiois*, and the first part is *Kan-*. *Tiois* appears to be related to the modern Italian term *tedeschi*, which was also a medieval designation for Germanic-influenced speakers outside the French-speaking world. In context, *Kan-* can be interpreted as the Greek Κάμαξ, Kamaks, meaning *trunk* in the sense of

a tree trunk. Czech *kmen*—see also the entry *Kandouon*. The connection between the two elements should be read as *the tribe of the Tiois*. The Italian and French classifications yield the early name of the people who later became known as *Teutsche*.

With connections to **Menosgada**, **Boioduron**, **Alcimoennis**, and **Kanduon 1**, it becomes clear that the *Tiois* were related to the Doric-Greek world.

The measurement point for **Kantioibis** is located at **Konstein, Grabengasse**. A linguistic connection is obvious.

A short distance away is the **Wellheim Marktplatz measurement point**, which shows no connection to **Kantioibis**. The Wellheim Marktplatz connection exists with Rottweil, Strasbourg, and Mainz (via **Bomoi Flavio**, **Argentoraton 1**, **Mokongiakon**), indicating a supraregional connection.

Alkimoennis

Ἀλκιμοεννισ, Ελκίμοεννισ,
Alkimoennis, Elkimoennis

Measurement points

Bad Wimpfen 1 Corneliastrasse
Beilngries Uebergang Altmuehl - Sulz
Berching Schwimmbadweg
Dannenberg, Am Markt
Eichstaett, Diözesanarchiv
Eichstaett, Mortuarium
Kelheim, Braeugraben
Konstein, Grabengasse
Lech, antike Flussmündung in die Donau
Main, Quelle des Weissen Mains
Mannheim, Paradeplatz
Sarre Rouge, Source
Vach / Mannhof

The measurement points essentially describe a region stretching from the source of the White Main in the east to Mannheim in the west and south to the Altmühl. This spans the watershed between the Danube and Rhine river systems. The region essentially encompasses the northern outskirts of the Roman Empire.

The locations of **the source of the White Main** (Greek 16) and **Mannheim Paradeplatz** (Greek 18,25) indicate primary distances, and the measurement points are more precisely measured, as evidenced by the smaller deviations at these two points.

Eichstätt Mortuary and Eichstätt Diocesan Archives

The radii of eight coordinates lie above Eichstätt's Cathedral Square. The Greek radius of 6,083 for the **Alkimoennis** coordinate passes through the center of the eastern end of Eichstätt's Cathedral of the Assumption and continues eastward between house numbers 1 and 9 on Cathedral Square. Here, the line runs almost exactly west-east. About 25 meters east of house numbers 1 and 9, it intersects the Greek radius of 17,05 from **Amaseia 1**, the Greek radius of 6,666 from **Segodonon**, and the Greek radius of 42,416 from **Chateau Thierry Avenue de Paris**, with an accuracy of less than 5 meters. This first, highly accurate measurement point, **the Eichstätt Diocesan Archive**, along with its linkage to the **Chateau Thierry Avenue de Paris** measurement point, belongs to an earlier coordinate layer and to settlements that were built or at least measuremented at astronomically fixed distances from one another.

The **Eichstätt Mortuarium** measurement point, located slightly south of the eastern end of the cathedral, is less precise, with a deviation in radii of up to 16 meters, but precise enough to serve as a measurement point. This is where the radii of the coordinates of **Alkimoennis**, **Kantioibis**, **Melokabos 2**, and **Morsouion 2** converge; the references now point north rather than west. The **Eichstätt Mortuarium** measurement point belongs to a later coordinate layer for several reasons:

1. The inaccuracy of the measurement point is an indication that existing linkages had to be taken into account;
2. the reference now points north, and the linkage with the coordinate **Kantioibis**—the tribe of the Tiois, the Teutons—points to the Roman Imperial period,
3. the measurement point is situated in a prominent location relative to Eichstätt Cathedral and indicates settlement continuity.

As a result, we see an earlier settlement with clear connections to present-day northern France and a later settlement phase with connections to the north.

The names Ἀλκιμοεννισ, Ελκῖμοεννισ

Alkimoennis begins with the Greek Αλκι-, meaning *strength or bravery*. The nominative form of *-moennis* is expected to be *-moenn*. The basic meaning of *-moenn* is likely to have been *human* or *man* with the meaning of *“human.”* Alkimoennis therefore means *strong men* or *strong people*. The name is linguistically related to the place names *Mannheim*, *Vach / Mannhof*, and the river name *Main*¹²⁷. The river name *Altmühl* may also be phonetically derived from Alkimoennis.

¹²⁷ See Pokorny I, p. 53.

Bibakon

Βίβακον, Βίβακον

Bibakon

Measurement points

Beilngries

Berching an der Sulz

Grossmehring, Ludwigstrasse

Kelheim, Braeugraben

Lech, antike Flussmündung in die Donau

Passau Klosterwinkel

Waffenbrunn, Muenchsbachsberg

The measurement points at **Beilngries** and **Berching on the Sulz**, together with the town of Biberbach located between them, mark **Bibakon**. Bibakon is therefore not a single town, but a series of towns that also mark the course of the Sulz. The **Beilngries** measurement point marks the transition from the Altmühl to the Sulz, while **Berching** likely marks roughly the midpoint of the river's course. The connection to the Altmühl River is established by the linkage of both measurement points to the **Alkimoennis** coordinate. The **Bibakon** coordinate is also linked to the **Kelheim Braeugraben** measurement point, which marks the confluence of the Altmühl River with the Danube.

Setouakoton

Setouakoton, Setouakoto

Setouakoton

Measurement points

Berching Schwimmbadweg

Cham, Luitpoldhöhe

Grossmehring, Ludwigstrasse

Masserberg, Meistergrund

Naab, confluence with the Danube

Stulln, Wölsendorf

Waffenbrunn, Muenchsbachsberg

A measurement point for the Setouakoton coordinate is located near **the town of Stulln**, on the Naab River. Additionally, the coordinate is linked to the measurement point at the **mouth of the Naab River** where it flows into the Danube. The **Setuakoton** coordinate thus describes the course of the Naab from the Danube to the town of Stulln.

The confluence of the Naab with the Danube can also be regarded as the confluence of the second river from Germania with the Danube; in any case, the linkage of the coordinate to the measurement point at the **Naab confluence** supports this interpretation.

Prodentia, Brodeltion

Προδεντία, Βροδελτιον
Prodentia, Brodeltion

Measurement points

Cham, Luitpoldhöhe

Ehrenfriedersdorf, Sauberg

Geneva, Rue de la Croix Rouge

Hagendorn near Cham (Switzerland)

Kelheim, Braeugraben

Masserberg, Source of the Werra

Nuremberg, Uhlandstraße

Προδεντία, Prodentia, is to be read as the Greek Προγεντία, Progentia, meaning *previous place* or, in a broader sense, *place of the ancestors*. This refers to the ethnos of the έλουήτιοι, Elouetioi, the *Helvetii*, whose polis is located at the coordinates **Ganodouron 1,2** (see also there).

The connection stems from the shared measurement points for the coordinates **Prodentia** and **Ganodouron 1,2**, which are **Cham Luitpoldhöhe, Hagendorn near Cham (Switzerland), and Geneva Rue de la Croix Rouge**. The measurement point **Cham, Luitpoldhöhe**, in Oberfranken is given as the ancestral home. Since this is a descriptive term, there would not have been a place name called Prodentia.

The northern Alpine foothills

The measurement points in this region have been partially analyzed. Due to its peripheral location within the study area, there are insufficient coordinates to determine additional measurement points.

The most important measurement point is **Pfarrkirchen, Gartlberg**, in Niederbayern, which marks the ancient Boiodouron, a site with diverse connections to the ancient world.

The measurement points in Ravensburg, Bregenz, Augsburg, Füssen, and Innsbruck correspond to the locations of Roman legions: **Ravensburg** to **Argentoraton 1** and **Nauaision 2**, **Bregenz** and **Augsburg** to **Bonna 1**, **Füssen** to **Traine 2**, and **Innsbruck Universitätsstrasse** to **Argentoraton 2**. These locations are thus associated with Rome's military campaigns.

The measurement points in Ravensburg and Füssen are centrally located within the urban area and indicate that there has been continuous settlement at this site since the calculation of the measurement points. The measurement points in Augsburg and Bregenz mark ancient port facilities or locations on a river or lake. The **Innsbruck Universitätsstrasse** measurement point is located at the eastern exit of Innsbruck's Old Town. The values of all distance intervals collectively indicate a later insertion into the coordinates.

Two measurement points for the coordinate **Augusta Ouindelikon** are pre-Roman and show no connection to Roman military campaigns to date. These are **Innsbruck Wilten Haymongasse** and, about 8 kilometers west of it, the measurement point **Birgitz, Hohe Birga**. Both measurement points indicate pre-Roman settlement.

Lukian, Likian, Lech (river)

Κατά τήν ἀρχήν τοῦ λυκί[] πο[] τοῦ
Και παρά τον Λυκίαν ποταμόν λικάτιοι
Τοῦ λικίου ποτ[]
Λικίαν ποτ[] λικάτιοι

[] Luki[] po[]
Lukian potamon likatioi
Likiou pot[]
Likian pot[] likatioi

Measurement points
Lech am Lech, Lechtalstrasse
Antike Mündung des Lech in die Donau

The modern-day Lech River is mentioned twice in the coordinate descriptions. The location of the river's upper course is indicated by a single coordinate; one measurement point for this is

located in the town of Lech am Lech on Lechtalstrasse, while the other measurement point marks the ancient confluence of the Lech with the Danube.

Cod. Vat. Gr. 177 gives the ancient name of the river as Lukian, while Cod. Vat. Gr. 191 mentions the variant Likiou / Likian. The river name is formed using the particles *li-* or *lu-* as a designation for a river or, more generally, a body of water.

Elsewhere in the coordinate descriptions, it is noted that the Likati settle along the river. The name of the Likati ethnic group contains a reference to water with the particle *li-*. For *ka-*, the meaning *ship or boat* is considered. Likati thus means *river boatmen*.

Drakouina

Δρακούϊνα, Δρακούϊανα
Drakouina, Drakouiana

Messpunkt
Augsburg Jakoberwall
Fuessen, Bahnhof
Ravensburg, Blaserturm

The **Ravensburg Blaserturm** measurement point is located in the historic center of the city. The calculation is performed regionally using the coordinates **Drakouina, Viana, Augusta Ouindelikon, Argentoraton 1, and Nauaision 2**. **Drakouina** serves as the eponymous coordinate for the measurement point, while **Argentoraton 1** and **Nauaision** establish the connection to Roman legions.

The name **Drakuina** may be a foreign designation from the Roman Imperial period; the actual place name would then have been different. The word element *Raven-* from Ravensburg has been attested since the 11th century; the *raven* is generally assumed to be the source of the name. From **Drakouina**, the interpretation of *-kouina* as *the bird night owl* emerges, according to Celtic sources *cavannus*¹²⁸. The attribute of cleverness attributed to ravens - and their mythological significance - is translated in the coordinate designation as the wisdom of the night owl. Parallel to the continuity of settlement, there is a continuity of names in the manner described.

¹²⁸ Vergleichendes Wörterbuch der Indogermanischen Sprachen, hrsg. von POKORNY, JULIUS. Band 1, Seite 331. Berlin, Leipzig 1930.

Fainiana

Φαινιάνα
Fainiana

Measurement point
Füssen, Bahnhof

The **Füssen train station** measurement point may date to the reign of Emperor Trajan due to its association with the **Traine 2** coordinate and may be connected to his measures to secure the Danube frontier. The years 98 or 99 AD are possible dates if the measurement took place concurrently with Trajan's fortification works.

Kambodounon

Καμβόδουνον, Καμβόδουνον
Kambodounon

Measurement points
Kempton I Haubenschloss
Kempton II Haubenschlosspark
Kempton III Braut- und Bahrweg

Großglockner, Hochtör Römerweg
Lech am Lech, Lechtalstrasse
Lienz Patriasdorf
Margrötzenkopf (2734m)
Nassfelder Ache Quellgebiet

The three **measurement points** in Kempton are located about 100 meters apart on a hill between the Rottach and Iller rivers, each approximately 1,3 kilometers from both river courses. About two kilometers northeast of the measurement points lies the Roman city site with its forum and thermal baths.

The presence of Roman legions at this site is indicated by the links from **the Kempton I Haubenschloss** measurement point to the coordinates **Traine 2** and **Nauaision 2**.

The **Haubenschlosspark** hill (Kempton II) may have been a settlement site of supraregional significance, as indicated by the association of the measurement point with the coordinate **Boiodouron**. The association with the coordinate **Kambodounon**, in turn, establishes a connection to the modern place name Kempton.

Brigantion

Βριγαντιον

Brigantion

Measurement point

Bregenz Leutbühel

Colm la Runga 2 Roemerlager

Innsbruck Universitätsstrasse

Kempten III

Otzenhausen Kahlenberg

The **Bregenz Leutbühel** measurement point is calculated using the regional coordinates of **Brigantion**, **Tasgaetium**, **Faeniana**, and **Augusta Ouindelikon**, as well as **Bonna 1**. The measurement point is located in an area where a former port facility is believed to have existed.

Augusta Ouindelikon

Augusta Ouindelik[], Augusta Ouindelikon

Augusta Ouendelik[], Augusta Ouindelikon

Measurement points

Augsburg Jakoberwall

Birgitz Hohe Birga

Bregenz, Leutbühel

Innsbruck Wilten Haymongasse

Lech, ancient confluence with the Danube

Ravensburg, Blaserturm

Wellheim, Market Square

The distance interval values indicate that the **Innsbruck Wilten Haymongasse measurement point** is pre-Roman, or at least clearly non-Roman. It lacks the characteristic connection to Roman legions that is evident at other locations in the Alpine and Pre-Alpine regions (see also **Füssen Bahnhof**, **Augsburg Jakoberwall**).

The other **measurement point** for this coordinate lies north of the town of **Birgitz** on a hill named **Hohe Birga**. This measurement point, which is linked via a distance interval to **Augusta Ouindelikon**, is also pre-Roman.

The **Augsburg Jakoberwall** measurement point **links** both to a Roman legion (**coordinate Bonna 1**) and to the **coordinate Augusta Ouindelikon**; at Augsburg, the Vindelici and Roman forces met. The measurement point is not located in the center of present-day Augsburg, but on the eastern border of the Jakobervorstadt, possibly on a former branch of the Lech River. The distance interval from **Augsburg Jakoberwall** to the coordinate **Danuvius - the mouth of**

the Aenus - points to a connection with the river. Further links exist with the coordinates **Drakouina** and **Lokoriton** (Ravensburg and Lohr am Main).

It appears that pre-Roman Ouindelikon is located on the Inn in the Innsbruck area, while the Roman settlement is in Augsburg.

Measurement point Innsbruck Universitätsstrasse

Measurement point Innsbruck Universitätsstrasse

The measurement point, located on the edge of Innsbruck's Old Town, is not calculated from the coordinate **Augusta Ouindelikon**, but rather from the coordinates **Brigantion**, **Eboduron**, **Abodiakon**, and **Argentoraton 2**. The link with **Argentoraton 2** indicates a Roman measurement from the Imperial period at this location.

Boiodouron

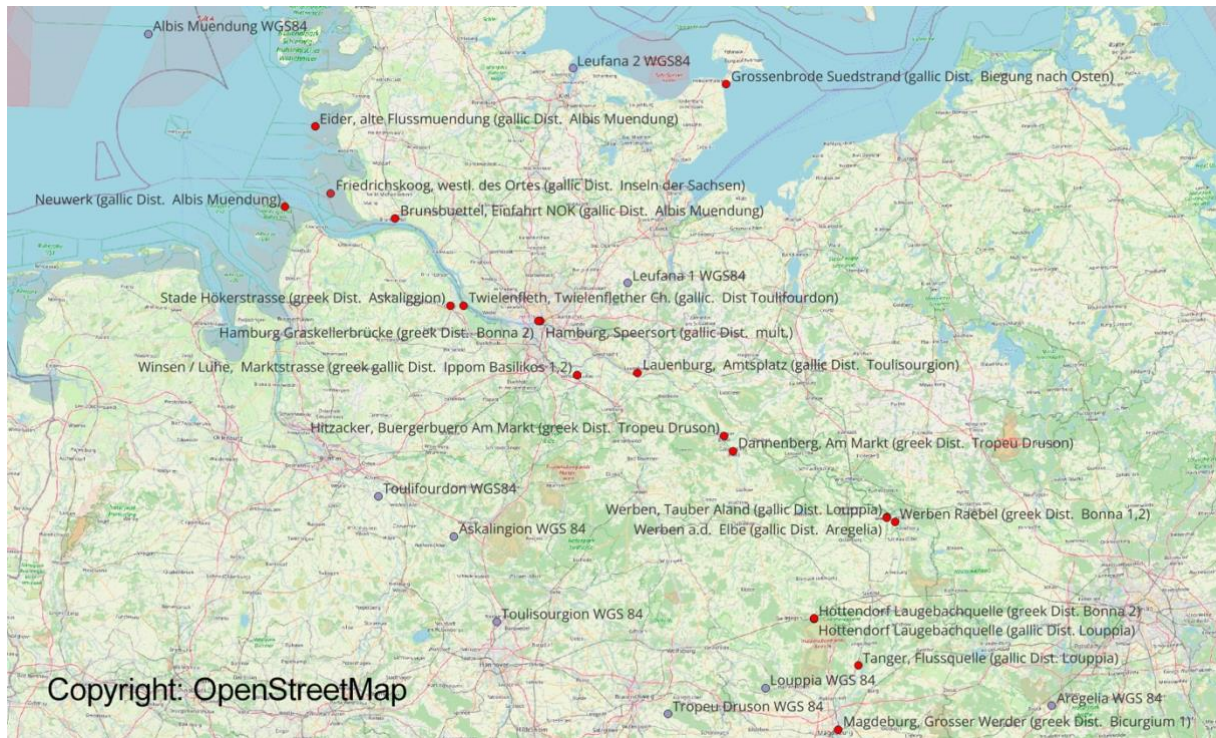
Βοιόδουρον, Βοιόδουρον Boiodouron

Measurement points
Amoeneburg Stiftskirche Bundesland Hessen
Genf Rue du Vidollet
Glauberg bei Glauberg Bundesland Hessen
Kempton II Haubenschlosspark
Konstein Grabengasse
Pfarrkirchen Gartlberg
Thunimont
Waffenrod Hauptstrasse

The measurement points for **the Boiodouron** coordinate lead westward into the Department of the Vosges (F) to the town of **Thunimont** and, within the state of Hesse, to the city of **Amoeneburg** as well as to the Celtic princely seat of **Glauberg near Glauberg** (both D). North of the Danube, Boiodouron connects with the **Konstein Grabengasse** measurement point, the measurement point for **the Kantioibis** coordinate. In the Alpine foothills, **Kempton II Haubenschlosspark** is a measurement point for Boiodouron. The widely spaced connections highlight the significance of Boiodouron. Boiodouron had ties to the Lakoi people in the Vosges, to the Celtic prince of Glauberg, to the Tiois north of the Danube, and to Kambodounon / Kempton.

The central measurement point for Boiodouron is located in **Pfarrkirchen Gartlberg**. This measurement point is among the settlements that have been calculated at specific distance intervals from one another. The coordinate **Dourokottoron** links, via its measurement point **Chateau Thierry Avenue de Paris** and the Gallic distance interval 42, to the measurement point **Pfarrkirchen Gartlberg**.

Elbe River from Magdeburg to the Elbe estuary



Measurement point Magdeburg, Grosser Werder

A probable former crossing point on the Elbe is the **Magdeburg Grosser Werder** measurement point, linked to the coordinates **Aregelia**, **Bikourgion 1**, **Kandouon 1**, and **Morsouion 2**.

Measurement point: Tanger, river source

The measurement point at the **source of the Tanger** is linked to **Kandouon 2**, **Argentoouaria**, and **Bikourgion 2**. A link to the coordinate **Louppia** indicates that the Tanger is a calm and leisurely-flowing river (see the etymology of Louppia under the entry of the same name). The linguistic affiliation of Tanger is unclear, but the connection of the measurement point to the **coordinate Atouakoukton** establishes a link to the *Tongroi* people, who lived in the vicinity of the present-day city of *Tonger* in Belgium. *Atouakouton* was the city of *the Tongroi*. The river name *Tanger*, 11th-century *Tongera*¹²⁹, is to be placed in a linguistic context alongside the *Tongroi*. The rivers Thame and Thames in England are likewise to be viewed in this context. The English adjective *tame* is likely related. The German *zahn* must have been *tam* prior to the second sound shift, i.e., in Roman times. Also related is the river name Tanais, broken down

¹²⁹ Greule: 528.

into *tan-ais*, the ancient name for the Don River, likewise conveying the sense of a *calm* river course. The meaning *calm* thus derives from the prefix *Tan-* in *Tanger*.

Measurement points: Werben on the Elbe, Werben Raebel, Werben Tauber Aland

There are three measurement points near the present-day town of Werben on the Elbe; see the entry „Meeting of the Roman Army with the Roman Fleet in Germania“

Louppia

Λουππία Λουππίας
Louppia

Measurement points
Bad Lippspringe Quelle der Lippe
Bismark
Dannenberg Am Markt
Hottendorf Laugebachquelle, gallic Dist.
Lauenburg Amtsplatz
Leubingen Fuerstenhuegel
Loing Embouchure dans la Seine
Loon-Plage Rue du Moulin
Quedlinburg, Basilika St. Wiperti
Schwagstorf Zum Kronensee II
Tanger Flussquelle
Vienau (Milde)
Werben Tauber Aland
Wesel Zitadelle

Louppia refers to an entire class of waterway names that describe a sluggish, gently flowing body of water. The coordinate is linked to the measurement points of several rivers that possess this characteristic.

For the coordinate designation Lou-p-pia, the *-pia* suffix is understood in a Latin-derived sense from *pius*, with connotations of *pious*, *devout*, *conscientious*, *loving*, *friendly*, *tender*, *good*, etc. For Lou-, according to DAUZAT, an interpretation based on the Irish *lo-*, Eng. *water*, is plausible. A water-related meaning for *Lou-*, albeit somewhat more distant, can also be found in Greek with gr. Λουτρόν - Eng. *bath* or *bathing place*, *water* for *bathing* or *washing*, and gr. Λουό, Eng. *to wash* or *bathe*. The meaning of Louppia is therefore a *gentle* or *placid river course*. Variants of Lupia and Louppia were common as names for bodies of water in Europe.

Regarding the interpretation of the name in German and French linguistics, different derivations are used; ultimately, from both perspectives, it refers to a calm river course with a barely noticeable current¹³⁰.

The coordinate Louppia, through its connections, refers to the **Milde** and **Tanger** rivers in the Altmark, the **Lossa** in Thuringia, the **Lippe** River, and the **Loing** River, which flows into the Seine. Further connections exist with **Lauenburg on the Elbe** and with **Loon-Plage** on the northern French Channel coast. Presumably, even more connections can be found.

The name of the Milde River points in the same direction as *-pia*, since the German word *mild* is associated with the qualities of gentle, good-natured, and friendly. The history of the river name's transmission does not preclude interpreting the name with this meaning. It stands to reason that the river name exists in two forms: Milde and Louppia. *Louppia* would have been the foreign designation, while *Milde* would have been the native designation.

The etymology of the river name Tanger can be found under the entry for the measurement point **Tangerquelle**.

The reference to the Lossa River in Thuringia is made through the link to the **Fürstenhügel Leubingen** measurement point. According to GREULE, the name derives from the Middle High German *laz*, meaning *sluggish* or *lazy*¹³¹.

Lippe River: A measurement point designated **Louppia** is located near the present-day **source of the Lippe River in the town of Bad Lippspringe**. The deviation from the source basin is only about 20 meters. The Lippe's confluence with the Rhine is marked by the measurement point **Wesel, Zitadelle**. The ancient name would have been similar to *Louppia* and would have included the meaning of the Latin suffix *-pia*.

The *Loing* River in France, a tributary of the Seine, has only a very slight current. The name *Lupa* is attested for the 7th century¹³².

In the place names Lauenburg an der Elbe and Loon-Plage, an earlier river name has been preserved phonetically. Dt. *Lau-* and dt. *mild* are often used as related terms in connection with the weather. *Loo-n-* likely refers to an ancient river course that no longer exists today.

¹³⁰ DAUZAT, ALBERT. Discussions: Les hydronymes Loup et Loue-Louain. In: Revue Internationale d'Onomastique, 6e année N°4, décembre 1954. pp. 271-272; doi : <https://doi.org/10.3406/rio.1954.1451>.

¹³¹ GREULE: 324.

¹³² DICTIONNAIRE TOPOGRAPHIQUE du Département de l'Yonne, Paris 1862: 73.

Tropeu Druson

Τρόπαιά Δρουα[], Τρόπευ δρουσον
Tropeu Druson

Measurement points

Bomlitz, Am Hoop
Braunschweig, Neue Strasse
Dannenberg, Am Markt
Foerste 1 am Harz
Hitzacker Bürgerbüro Am Markt
Hottendorf Laugebachquelle, gallic Dist.
Ilmenau-Luhe-Zusammenfluss
Poritz an der Milde
Schwagstorf Zum Kronensee I
Söse Quelle
Twielenfleth Twielenflether Chaussee
Werben a.d. Elbe
Werben Raebel

Tropeu Druson: STÜCKELBERGER / GRASSHOFF assume that this refers to a victory monument erected by the younger Drusus near the Weser in A.D. 16¹³³. The measurement points with Greek distances point to Nero Claudius Drusus, a stepson of Augustus. His campaigns in Germania led the Roman legions as far as the Elbe until his death in 9 BC. A derivation from the Greek Τροπή (Trope), meaning *turn* or *turnaround*, is plausible, and the *turnaround* would refer to Drusus's decision not to cross the Elbe¹³⁴. The identified measurement points with Greek distances, referring to the period 12–9 BC, are: **Braunschweig**, site of a battle involving the Marcomanni, the **Upper Harz region** with the source of the Söse River, **Twielenfleth**, **Hitzacker**, **Dannenberg** and **Werben Raebel**, the location where Drusus decided against crossing the Elbe.

The Gallic measurement points for the **Tropeu Druson** coordinate are to be understood as the locations of ethnic groups situated on the southern bank of the Elbe, whose settlements extend downstream from the town of Werben on the Elbe, opposite the confluence of the Havel River. These unnamed peoples were only temporarily subjugated by the Romans under Drusus. These ethnic groups took part again in the later battles at (1) the Wiehengebirge, (2) the Söse River near the town of Foerste in the Harz Mountains, and (3) the Milde River near the town of Poritz, which shows that their subjugation under Drusus was only temporary.

¹³³ STÜCKELBERGER / GRASSHOFF, Bd. 1: 233.

¹³⁴ PATERCULUS, 2,107.

Toulisourgion

Measurement point

Lauenburg, Amtsplatz

Downstream on the northern bank of the Elbe lies the measurement point **Lauenburg Amtsplatz**, linked by a Gallic distance interval with the coordinates **Toulisourgion**, **Lefana 1**, **Louppia**, **Morsouion 2**, and **Tabuda estuary**.

Askaliggion

Ἀσκαλίγγιον Ἀσκαλῖνγιον

Askaliggion Askalingion

Messpunkte

Winsen an der Luhe, Marktstrasse

Ilmenau-Luhe-Zusammenfluss

Stade, Hökerstrasse

Aschersleben, Düsteres Tor

Eider, alte Flussmündung

Finsterlohr, Keltenwall

Hamburg, Speersort

Ruwer, Ruwerarmmündung

Schwagstorf, Zum Kronensee II

Twielenfleth, Twielenflether Chaussee

Werben Tauber Aland

Near the confluence of the Ilmenau and Luhe rivers lies the **Winsen an der Luhe Marktstrasse** measurement point, linked to **Askaliggion**, **Askibourgion 2**, and **Ippon Basilikos 1,2** (Annaba, Algeria). **Ippon Basilikos 1,2** establishes long-distance connections to North Africa (**Annaba**, **Algeria**).

At the confluence of the Ilmenau and Luhe rivers lies the **Ilmenau-Luhe Confluence** measurement point, linked via a Gallic distance interval to the coordinates **Askaliggion**, **Morsouion 2**, **Tabuda Estuary**, **Tropeu Druson** and **Toulifourdon**.

In the historic downtown area of the city of Stade, the **Stade Hökerstrasse** measurement point is situated on high ground above the Schwinge River. It is linked via a Greek distance interval to the coordinates **Askaliggion**, **Toulifourdon**, **Toulisourgion**, **Albis Estuary** and **Ippon Basilikos 1** (Annaba, Algeria). Long-distance connections to North Africa existed from ancient Stade.

The name Askaliggion represents a krasis of As-ka-li-iggion. *Ka-li* consists of the elements *-ka-*, meaning *ship*, and *-li-*, meaning *river*, and is to be understood as *ship river*; *-iggion* is a Greek diminutive, a form of reduction or diminution. The implied meaning is thus *small ship river*. The measurement points for **Askaliggion** are located in **Winsen an der Luhe**, at the **Ilmenau/Luhe confluence**, on **Höxterstrasse in Stade**, and in **Speersort, Hamburg**; all support this interpretation.

For *as-*, the Doric form *άς*, *as*, meaning *until*, *as long as*, or *to*, comes into consideration. In connection with the *small navigable river*, this implies that the river was navigable by boat up to that specific point.

Alternatively, it is conceivable to interpret the particle *as-* as a complement to *-ka-*, meaning *ship*. In this case, the meaning is unknown.

Linguistically, this represents a synthesis of the non-Indo-European *ka-* with the Indo-European *li-* and a Greek diminutive particle.

Measurement point: Hamburg Speersort

Measurement points

Hamburg Speersort

Hamburg Graskellerbrücke

The **Hamburg Speersort measurement point**, located north of the Elbe, is linked via Gallic distance intervals to the coordinates **Albis Muendung**, **Askaliggion**, **Morsouion 2**, and **Taderion (1)**. The link to Taderion (1) identifies the measurement point as the site of a battle. The location of the Roman fleet is marked by the **Hamburg Graskellerbrücke** measurement point. See the entry *Battle of Hamburg on the Elbe* for more information.

Toulifourdon

Τούλιφουρδ Τουλῖφουρδον

Toulifourd Toulifourdon

Messpunkte

Ilmenau-Luhe-Zusammenfluss

Soltau Friedrichseck Grosse Aue

Stade Hökerstrasse

Thuine Hauptstrasse

Twielenfleth Twielenflether Chaussee

Downstream lies the **Twielenfleth Twielenflether Chaussee** measurement point, which is linked to the coordinates **Toulifourdon, Askaliggion, Lefana 1, Morsouion 2, and Tropeu Druson**.

The name can be broken down into *Tou-li-fourdon*. *Tou-* is the place prefix, *-li-* denotes a body of water or a river, and *-fourdon* means *ford* in German¹³⁵. The name thus means *near the river ford* or *place of the river ford* and must refer to a crossing over the Elbe River slightly upstream from where the Schwinge River flows into the Elbe today.

Brunsbüttel measurement point

Measurement point

Brunsbüttel NOK (North Sea–Baltic Canal) entrance

The **Brunsbüttel NOK (Nord-Ostsee-Kanal) entrance** measurement point is linked to the coordinates **Albis Estuary, KIM First Foreground north of the Elbe Estuary, KIM Next Foreground (after the first foreground north of the Elbe Estuary), Renos Eastern Estuary 2, Ouisourigios Estuary 2, Ouisourigios Springs**. During the Roman Empire, the measurement point was located approximately 42 kilometers upstream from the Elbe estuary at that time.

Friedrichskoog measurement point

The **Friedrichskoog** measurement point is located approximately 7 kilometers southwest of the town of Friedrichskoog-Spitze and is linked to the coordinates **Albis Estuary, Saxon Islands, Lefana 1, and KIM First Foreland north of the Elbe Estuary**.

Albis Mündung

Αλβιο, Λάβιο ποτ

Albis, Labio

Elbe, Flussmündung

Messpunkte

Brunsbuettel Einfahrt NOK

Eider alte Flussmuendung

Friedrichskoog westl. des Ortes

Hamburg Speersort

¹³⁵ SCHEUNGRABER / GRÜNZWEIG: 346 ff.

Katwijk Hoorneslaan
Katwijk Nieuwe Roversbrug
Neuwerk
Soltau Friedrichseck Grosse Aue
Stade Hökerstrasse
Stedorf Stubbenkamp
Werben a.d. Elbe

The coordinate describes the ancient mouths of two rivers, the present-day Elbe and the present-day Eider. The **Neuwerk** measurement point marks the location of the Elbe estuary during the Roman Empire and is linked to the **Albis-Muendung** coordinate. The **Alte Eider-Muendung** measurement point is linked to the **Albis-Muendung** coordinate and marks the river's mouth during the Roman Empire, approximately 12 kilometers southwest of today's Eider barrage.

The supraregional significance of **the Albis Estuary** stems from its linkage with the measurement points **Katwijk, Hoorneslaan, and Katwijk, Nieuwe Roversbrug**.

Part V Geography in the Service of Military Commanders

The locations where military events took place are represented by measurement points. This illustrates which units or peoples participated in a battle and what their positions were on the battlefield. In Germania and Belgica, the Roman position is linked to coordinates using Greek distance intervals. The measurement point for Rome's opposing side is represented using the Gallic distance interval. The battle site is not shown as a whole; instead, the positions of the participants are depicted individually with measurement points.

The Roman legions involved in a battle are identified by their linkage to coordinates that include a legion name. Other linked coordinates also indicate a battle. In Germania, linkages to the coordinates **Nauaision 1** or **2** and to **Mounition** indicate participation in battles. In the case of naval operations, a link to the coordinate **Eastern Renos Estuary 2** indicates a military event. In Belgica, links to the coordinates **Kaisaromagos 1 or 2**, **Argentoraton 1 or 2**, and **Augustodunum** indicate a military event.

The association with a battle is further confirmed by the link to the coordinate **Taderion 1**.

The fact that this depicts a battle situation is evident from the fact that two or more measurement points are located close to one another, usually only a few hundred meters apart, and based on the topographical location, for example on opposite sides of a river.

Taderion

Ταδερίον

Taderion

Messpunkte in Gallien

Camp des Belges 2, a une distance d'environ de 4 km du camp de Caesar, pres de Berry-au-Bac, avec Menapii, Atrebatii

Solesmes 2, Impasse des Quatre Amants

Montreuil-sur-Mer, Rue Saint-Gengoult

Messpunkte in Germanien

Werben an der Elbe

Schwagstorf, Zum Kronensee I

Foerste 1 am Harz

Poritz an der Milde

**Eider, alte Flussmuendung
Hamburg, Speersort
Gauaschach Sebastiansstrasse
Haltern am See, Weseler Strasse
Braunschweig, Marstall**

The coordinate **Taderion 1** becomes understandable when broken down into Τα-δερί-ον, Taderi-on, and -deri- is translated as δῆρις, *battle, fight*. Ta- is the locative prefix, meaning *there* or *place of*. The translation of Taderion is thus *battlefield*. The associations of the coordinate support the linguistic interpretation. The coordinate **Taderion 1** is linked, in each case via a Gallic distance interval, to the non-Roman position in the battle. There has likely never been a place named Taderion near the modern city of Münster, where the coordinate would be located.

In Gallia Belgica, two significant battles on the ancient rivers Axona and Sambre are linked to the coordinate **Taderion 1**, as well as another near the present-day town of Montreuil-sur-Mer. Based on the measurement points, the ancient river Axona corresponds to the present-day river Aisne, and the Sambre corresponds to the present-day river Selle.

Battle sites in Germania: First, there are the positions of a battle in the Wiehengebirge, where the Roman position lies south of the ridge near the town of Vehrte and the Germanic positions north of it near the town of Schwagstorf. Then there is a battle in the southern Harz Mountains on the Söse River, with the positions on opposite sides of the river. Another battle took place in the Milde lowlands near Stendal in the Altmark; the positions are on opposite sides of the river valley. Presumably, this is where the information on the three major battles of the Germanic War - the Battle of Varus, the Battle of Idistaviso, and the Battle of the Angrivarian Wall - reported by Tacitus can be found¹³⁶. **Taderion 1** is also linked to sites of naval operations in the North Sea and on the Elbe River.

Additional battle sites linked to **Taderion 1** are located near Gauaschach, Haltern am See, and Braunschweig.

Caesar's Campaigns

The Helvetii's march through the Roman province (Geneva)

**Measurement points
Genf, Rue de Beaulieu 1
Genf, Rue de Beaulieu 2
Genf, Rue du Vidollet
Genf, Rue de la Croix Rouge**

¹³⁶ Tacitus, Annals 2.19

In the northern part of present-day Geneva, near Rue du Vidollet, there is a depiction of the attempts by the Helvetii—also reported by Caesar—to force their way through Roman territory¹³⁷. There lies the measurement point, calculated using Gallic distances, for the Helvetii (with the coordinate **Ganodouron 2**) and their allies, the Boii (with the coordinate **Boiodouron**), the Raurici (with the coordinate Augousta Raurikon 1), the Triboci (with the coordinate **Elkebos 1**), and an unnamed tribe to be located east of the Neckar River (coordinate **Segedonon**). Their route to the Rhône is blocked about 400 meters further south by the Sequanii (coordinates **Diatauion** and **Ekouestris 1,2**) and the Lakoi (coordinate **Toullon 1**) stationed there, under the command of Caesar (coordinate **Kaisaromagos 1**) and Roman troops (coordinates **Argentoraton 1**, **Bonna 1**, **Augustodunum**).

The first question to be clarified is whether the representation of the measurement points corresponds to the same historical event - the exodus of the Helvetii from their territory - that Caesar reports. The composition of the Helvetian measurement point includes Helvetii, Raurici, and Boii together. Caesar also mentions the Raurici and Boii as allies of the Helvetii. Regarding the two other peoples, the names given in the coordinates and in Caesar's account differ. The coordinate descriptions list the Triboci and an unnamed people associated with the polis of Segedonon and located east of the Neckar River; Caesar names the Tulingi and Latobriges as additional allies.

Regarding the location of the allies, the information provided by the coordinate descriptions and Caesar once again aligns. The two peoples mentioned by Caesar are direct neighbors of the Helvetii; "finitimis uti eodem," he writes. The territory of the Tribocci and the area east of the Neckar also fall within the Helvetii's neighborhood, so that the allies' origins are described as being roughly the same in regional terms.

On the opposing side, the Sequani are positioned about 400 meters to the south as allies of Rome against the Helvetii. It is quite possible that this refers to the situation in April 58 B.C. At that time, the Sequani were on Rome's side and had not yet reached an agreement with the Helvetii or exchanged hostages with them. Caesar had only one legion at his disposal in Trans-Gaul and therefore demanded that the entire province provide as many soldiers as possible¹³⁸. It is quite possible that in this situation the Sequanii were deployed as auxiliary troops to block the Helvetii's path. It was only at this time that the Helvetii attempted to take the route south. After failing here, they turned to the Haedui to secure passage via a different route with their help. The event depicted by the markers can therefore be dated to April 58 BC or shortly thereafter.

Additional information is provided regarding the whereabouts of the surviving Helvetii after their defeat by Caesar, as indicated by the measurement point in **Geneva, Rue de la Croix Rouge**, south of the Rhône's outlet from Lake Geneva. Here, calculated using Greek distances, the coordinates **Ganodouron 1**, **Foros Tiberiou**, and **Ganodouron 2** share a common measurement point with **Kaisaromago 2**. The interpretation in such cases is that a foundation by Rome - in this instance by Caesar - took place, involving the other parties mentioned (or

¹³⁷ CAESAR, GAIUS IULIUS, *De bello Gallico*, 1, 8, 1-4, übersetzt und kommentiert von Marieluise Deißmann, Reclams Universal-Bibliothek Nr. 14372, Stuttgart 2023: 17-18.

¹³⁸ CAESAR, GAIUS JULIUS, *De bello Gallico* : 17-18.

coordinates). Accordingly, Caesar not only sent Helvetian survivors back to their former settlement areas but also settled some at the site of present-day Geneva, in the territory of the Allobroges.

Noviodunum (Villeneuve-Saint-Germain on the Aisne)

Measurement points

Villeneuve-Saint-Germain Aisne

Villeneuve-Saint-Germain

The Roman military measurement point lies east of the Suessiones' oppidum, outside the wall and the deep ditches protecting the oppidum, near the course of the Aisne River. The measurement point connects via a Greek distance interval with the coordinates **Kaisaromago 1,2**, **Bonna 2**, **Argentoraton 2**, and **Dourokottoron**. Accordingly, the Remers also participated in the military operation.

On the Belgic side, the oppidum was occupied by the Suessiones (Gallic link to **Aug. Ouessones 1**), the Nervii (Gallic link to **Baganon**), and the Subanecti (Gallic link to **Ratomagos 1**). Their measurement point, **Villeneuve-Saint-Germain**, lies roughly in the center of the site today. The measurement point does not correspond to the coordinate Taderion 1 and is therefore not identified in the coordinates as the site of a battle. This is consistent with Caesar's account, according to which the Suessiones surrendered and Caesar accepted the surrender after receiving the hostages¹³⁹.

Battle of the Axona (Berry-aux-Bac on the Aisne)

Measurement points

Berry-aux-Bac Greek Dist.

Camp des Belges 1-3 Gallic Dist.

In his Commentaries on the Gallic War, Caesar describes the course of a battle on the River Axona. According to Jullian¹⁴⁰, the site of this battle can be located on the River Aisne, near the town of Berry-au-Bac on the Aisne.

Near the town of Berry-au-Bac, there are four measurement points that reflect the composition of the forces involved in the battle. One measurement point represents Caesar's legions and the auxiliary troops of the Treveri, north of the Aisne River, in the present-day town of Berry-au-Bac. Three markers, presumably for their camps, represent the Belgae, divided by tribe. Caesar reports (2.7.3–4) that they set up their camp less than two (Roman) miles from

¹³⁹ CAESAR, GAIUS JULIUS, The Gallic War: 2.13.1.

¹⁴⁰ JULLIAN, CAMILLE, Histoire de la Gaule, Tome 3, La Conquete Romaine et les Première Invasions Germaniques, 4. Auflage, Paris 1926: 252.

his camp, and the smoke from the campfires indicated that the Belgae's camp was more than eight (Roman) miles wide.

Caesar's first statement can be confirmed based on the measurement points. The distance to the first camp of the Bellovacii and Tungri was 2.4 kilometers from Caesar's camp, as determined by the measurement point. The next camps of the Menapii and Atrebatii were located behind the first camp, four kilometers from Caesar's camp; the third camp of the Ambianii, Nervii, Suessionii, and Viromanduii was situated about 5.5 kilometers from Caesar's camp, behind the first two Belgic camps.

The Bellovaci, who had claimed leadership in the war for themselves, camped closest to Caesar's camp, together with the Tungri.

Battle of the Sabis (Solesmes on the Selle)

Measurement points

Solesmes 1 and Solesmes 2, Impasse des Quatre Amants

The measurement points Solesmes 1 and Solesmes 2, Impasse des Quatre Amants, most likely represent a military operation during the Gallic War. Solesmes 1 exhibits the characteristic features of a Roman position. The measurement point with Greek distance intervals is linked to **Kaisaromagos 1 and 2, Bonna 2, and Argentoraton 1**. It is located west of the Selle River, about one to one and a half kilometers south of the village of Solesmes, with a hillside behind it.

The measurement point Solesmes 2, Impasse des Quatre Amants, is located east of the present-day village of Solesmes, 1.7 kilometers from Solesmes 1, and is marked with Gallic distance intervals. This measurement point is situated east of the Selle River. North of the measurement point, the Le Béart stream flows in an east-west direction before emptying into the Selle.

The Gallic measurement point is linked to **Baganon, Augusta Viromanduorum, Origiakon, Taderion 1, and Kaisaromagos 1**. There are no links to Samarobriva 1, 2, Tarvenna, or Kastellon. On the Belgic side, the Nervii (with Baganon), the Viromandui (with Augusta Viromanduorum), and the Atrebatas (with Origiakon) are thus involved. The connection with Kaisaromagos 1 is not immediately clear.

The participation on the Belgic side suggests that these may have been positions during the Battle of the Sabis River.

Germanic Wars

Battle of Braunschweig (12–9 BC)

Measurement points

Braunschweig Marstall

Braunschweig Neue Strasse

The two measurement points illustrate a typical battle scenario. The **Braunschweig Marstall** measurement point, calculated using the Gallic distance interval, is linked to the coordinates **Stereontion 1**, **Toulisourgion**, **Ouisourigios Quellen**, **Mounition**, **Maroboudon 1**, and **Taderion (1)**. **Taderion (1)** is linked to Gallic 13, which highlights the battle's great significance. The link to **Maroboudon 1** indicates the participation of troops on the side of Rome's enemies, who can be attributed somewhat later to the rule of Marbod.

The Braunschweig Neue Straße measurement point, located about 200 meters away, links via a Greek distance interval to the **coordinates Bonna 1 Legio I Minervia**, **Mounition**, **Nauaision 2**, and **Tropeu Druson**; the latter coordinate confirms the connection to Drusus's campaign.

Tiberius' winter camp in Germania (4–6 CE)

Measurement points

Bad Lippspringe Quelle der Lippe

Hottendorf Laugebachquelle und Quelle der Milde

Velleius Paterculus reports in his *Historia Romana* on the campaigns of the future Roman Emperor Tiberius in Germania. In the context of a description that portrays Germania as a territory already pacified by the Romans, he discusses a winter encampment of the troops in Germania, which must have taken place in 4, 5, or 6 CE. He reports,

“...ad caput Lupiae fluminis...”,

i.e., at the headwaters of the river Lupia, Tiberius established a winter camp¹⁴¹. The term “*headwaters*” for one or more river sources is used in the coordinate descriptions in several places and refers to the source of the river.

¹⁴¹ VELLEIUS PATERCULUS, *Historia Romana Römische Geschichte* 2,105. Übersetzt und herausgegeben von Marion Giebel. Reclams Universal-Bibliothek Nr. 8566. Ergänzte Ausgabe Stuttgart 2004: 224.

It is traditionally assumed that Tiberius's winter camp must have been located at the source of the Lippe River, since Lupia corresponds to today's Lippe River. A measurement point in **Bad Lippspringe at the source of the Lippe** could confirm this. The distance intervals of the coordinates show that the coordinate **Louppia** refers to the source of the Lippe and that Roman legions (**Bonna 1, Nauaision 2**) were stationed at this measurement point.

It is also possible, however, that the river Lupia mentioned by Paterculus is the modern-day Milde River. Two measurement points on a tributary of the Milde, the **Laugebach near Hottendorf**, form the basis for this interpretation. The Gallic measurement point at the **source of the Laugebach**, when linked to **Streontion 2**, reveals itself to be a significant Germanic site. One might think of a settlement site, but given the later monastery complex nearby, it is more likely a sacred site for the Germanic peoples. However, due to the lack of a connection to **Taderion 1**, it is not a battlefield. About 250 meters away lies a Greek measurement point that, based on its connections to **Bonna 2, Agrippineensei**, and **Argentoraton 2**, indicates the presence of Roman legions. It is therefore also possible that Tiberius's winter camp is located at the source of the Laugebach; the river's name and the calculation of the measurement points support this conclusion.

See also the entry for **Louppia**.

Battle of Hamburg on the Elbe (4–6 CE)

Measurement points

Hamburg Speersort

Hamburg Graskellerbrücke

Paterculus reports on the Roman fleet that sailed up the Elbe from the North Sea during the years 4–6 AD and met up there with the Roman army.¹⁴² The fleet arrived,

“...a plurimarum gentium victoria...,”

with victories over numerous tribes. One of these victories was won by the Romans in the area of present-day Hamburg. In the historic center of Hamburg, there are two measurement points - one Gallic and one Greek - that can be identified as the site of a battle.

The **Hamburg Speersort measurement point** is linked via a Gallic distance interval to the **coordinate Taderion 1** and is thus marked as the site of a battle. As expected, there is a measurement point nearby that links via a Greek distance interval to the locations of Roman legions. About 700 meters to the west lies the measurement point corresponding to the coordinates **Bonna 2, Nauaision 2**, and **Renos östliche Mündung 2**. The latter coordinate indicates that a Roman naval operation took place here.

¹⁴² VELLEIUS PATERCULUS: 225.

Meeting of the Roman Army and the Roman Fleet in Germania (4–6 CE)

Measurement points

Werben an der Elbe

Werben Raebel

Werben Tauber Aland

Paterculus reports on a meeting between the Roman army and the Roman fleet in the interior of Germania on the Elbe River during the years 4–6 AD. The fleet had sailed up the Elbe from the North Sea.¹⁴³ The Roman army had marched 400 miles from the Rhine to the Elbe.

Near the town **of Werben on the Elbe**, opposite the confluence of the Havel and the Elbe, there are three measurement points: two Gallic and one Greek. The Greek measurement point aligns with the coordinates **Bonna 1 and 2, Nauaision 1 and 2, Argentoraton 2, and Ouetorra 1**, and thus serves as evidence of the presence of Roman legions.

The distance of 400 Roman miles indicates that Paterculus is referring to legions stationed on the Upper Rhine that participated in the campaign. For legions from the Bonn or Cologne area, this distance is too great. The coordinate **Argentoraton 2** indicates a stationing between Strasbourg and Breisach; here, the distance of 400 Roman miles corresponds to the town of Werben.

Two measurement points with Gallic distances are located 3,5 kilometers from the Greek measurement point: **Werben on the Elbe** and **Werben Tauber Aland**. The corresponding coordinates: **Tropeu Druson** points to Germanic tribes south of the Elbe in the Hitzacker area, **Aregelia** to areas on the right bank of the Elbe, **Toulisourgion** to inhabitants north of the Elbe near Lauenburg, and **Askaliggion** to the mouth of the Luhe River where it flows into the Elbe. The somewhat blurry image primarily shows tribes along the Elbe River from the North Sea to Werben that have gathered here.

There is no doubt that this must have been a major Roman victory. This is evidenced by the large number of Roman legions that gathered there. Furthermore, the measurement point **Werben on the Elbe** is linked to the coordinate **Taderion 1** - meaning *battlefield* - with a distance interval of 24. Since Paterculus makes no mention of a battle at the meeting of the Roman fleet and army, the victory was likely achieved without a military engagement.

¹⁴³ VELLEIUS PATERCULUS: 225.

Battle of Varus (9 AD)

Measurement points

Vehrte bei Osnabrück

Schwagstorf Zum Kronensee I

Schwagstorf Zum Kronensee II

All three measurement points are associated with a military conflict. The location in the Wiehengebirge northeast of Osnabrück and the origin of the Germanic forces involved suggest that this depicts the battle known as the Battle of Varus. Accordingly, the Roman forces were positioned south of the village of Vehrte, while the Germanic forces gathered north of the Wiehengebirge mountain range.

The coordinate representation depicts a battle situation reported by the Roman historian Florus. According to him, there was a battle with the Germanic tribes around Varus's camp¹⁴⁴. This corresponds to the representation of the measurement points, suggesting that Florus and the authors of the coordinate representation may have drawn on the same source material. The measurement point **Vehrte near Osnabrück** is linked via a Greek distance interval to the coordinates **Bonna 1**, **Ouetorra 1**, **Nauaision 1** and **Agrippineensei**. It can thus be attributed to a Roman military operation.

North of the adjacent ridge of the Wiehengebirge, approximately 5,5 kilometers away, are the two measurement points **Schwagstorf Zum Kronensee I** and **Schwagstorf Zum Kronensee II**, which are linked via Gallic distance intervals.

Linkages of the Schwagstorf I measurement point

Taderion 1 (marked as *a battlefield*)

Toulisourgion (measurement point Lauenburg on the Elbe)

Tropeu Druson (measurement points Hitzacker on the Elbe, Dannenberg on the Jeetzel)

Amaseia 1 and **Amisias 2** (Göttingen, Marsberg, Schlitz, Asemissen, Katzenelnbogen, and other locations in eastern North Rhine-Westphalia, Hesse, and western Saxony-Anhalt)

Linkages of the Schwagstorf II measurement point

Askaliggion (measuring station near Winsen / Luhe)

Streontion 2 (measurement points in eastern Lower Saxony)

Ouisourigios Quellen (measurement points near Quedlinburg, Oberdorla, and in the Upper Harz)

Louppia (measuring point at Werben / Elbe)

The source regions on the Germanic side are located in the north, in the eastern half of Lower Saxony, including the Elbe region from Winsen an der Luhe to Magdeburg. The source regions also include the Harz region and the western part of the present-day state of Saxony-Anhalt. An exception is the non-participating Mounition, today's town of Altenbergen. The areas bordering the North Sea were also not involved. To the south, the Hessian region was involved, as well as areas of origin in the east of today's state of North Rhine-Westphalia. The widely

¹⁴⁴ Complete Works of Florus, Delphi Classics, Hastings, UK, 2018, XXX Bellum Germanicum, 34: 513.

dispersed areas of origin of the Germanic confederations lead to the conclusion that this was an immense uprising.

Battle on the southern edge of the Harz Mountains - Idistaviso (14–16 CE)

Measurement points

Förste 1 am Harz

Förste 2 am Harz

The measurement point with Gallic distance intervals east of the Söse River indicates Germanic forces, as evidenced by the linked coordinates **Tropeu Druson**, **Amaseia 1**, **Kandouon 1**, and **Stereontion 1**. The coordinate **Taderion 1** is linked to the Gallic distance interval twelve, which underscores the significance of the military conflict.

With **Stereontion 1** and **Kandouon 1**, the geographical origin of the Germanic peoples lies in the area of present-day Lower Saxony, south of the Aller River, and in western Saxony-Anhalt. The coordinate **Tropeu Druson**, using a Gallic distance, indicates an origin in the area south of the Elbe River near Hitzacker and Dannenberg.

West of the Söse River, the measurement point **Förste 2** in the Harz Mountains is linked via Greek distance intervals to the coordinates **Bonna 2**, **Nauaision 2**, **Traine 2**, and **Agrippinensis**. These are Roman military units.

Given the link to the Gallic distance interval of twelve, this must have been a battle of significance to Rome. Among the battles known to us, it is likely the Battle of Idistaviso, from which the Roman forces emerged victorious. The topography described by Tacitus fits, and, more important, the origin of the Germanic forces aligns with the location of the battle¹⁴⁵.

However, Tacitus also reports that the battle took place on the Visurgis River (referred to as Ouisourigios in the coordinates), which is identified with today's Weser. However, the measurement point is not on the Weser but on the Söse River. According to the coordinate descriptions, however, the Ouisourigios has not just one source but several - Πηγαί Ποτῦ (Pegai Potu), meaning "sources of the river," as the text states. One measurement point for the sources of the Ouisourigios is the headwaters of the Weser (at the confluence of the Werra and Fulda) in **Hannoversch Münden**, **Wallstraße**, with a distance interval of 8,5. Another measurement point for the sources of the Ouisourigios is located in the Harz Mountains near the **summit of the Bruchberg**, which is a source region for several rivers (distance interval from the **Ouisourigios Quellen** coordinate: 3,25). Along with other rivers, the Söse River is also fed from the moor and can thus also be referred to as an Ouisourigios.

For the Söse River, see also the entry on the **Ouisourigios Quellen**.

¹⁴⁵ P. CORNELIUS TACITUS, *Annalen*, 2,17, hrsg. von Erich Heller, Mannheim und München, 6. Auflage 2010: 127.

Battle near the Angrivarian Wall s (14–16 CE)

Measurement points

Poritz an der Milde

Vienau an der Milde

The measurement point west of the Milde River near the town **of Vienau** shows Roman units fighting on the Roman side alongside allies from Germania (coordinates **Louppia and Toulisourgion**, both located on the Elbe River). On the Germanic side, east of the Milde River, the **coordinates Tropeu Druson, Ouisourigios Quellen, Morsouion 2, Taderion 1, and Bikourgion 1** are assigned to the measurement point there. The Germanic tribes opposing the Romans thus include those living in the Elbe region upstream from Hitzacker, in eastern Lower Saxony, and east of the Harz Mountains.

In the *Annals*¹⁴⁶, Tacitus provides an account of a battle between the Germanic tribes and the Romans that took place following the Battle of Idistaviso, which the Germanic tribes lost. A passage in the text suggests that this second battle took place near the Elbe River. According to this, the Germanic tribes intended to abandon their settlements and retreat across the Elbe, but ultimately chose to engage in another battle against the Romans.

¹⁴⁶ P. CORNELIUS TACITUS, *Annalen*, 2,19-21.

Further military measurement points

Clash near Amöneburg (undated)

Measurement points

Radenhausen bei Amoeneburg

Amoeneburg Burgstraße

A military operation in which Roman units are located approximately 1,5 kilometers west of Mount Amöneburg. The measurement point **on the castle hill Amoeneburg Burgstrasse** connects via Gallic distance intervals to the coordinates **Askibourgion 1, Feugaron, Mattiakon, Nauaision 1, and Stereontion 2**.

On the Roman side, the **coordinates Amisias 2, Bonna 2 (Legio I Minervia), Nauaision 2, and Ouetorra 2 (Legio XXX Ulpia)** are linked to the measurement point **Radenhausen near Amöneburg**.

This is likely not a battle; the measurement point **Amöneburg Burgstrasse** does not match the **Taderion (1) coordinate**.

Battle of Gauaschach (undated)

Measurement points

Gauaschach

Gauaschach nördlich

The linkage of the Gauaschach measurement point with a Gallic distance interval to the **Taderion (1)** coordinate indicates a battle. The Roman forces are positioned on a hill approximately 1,3 kilometers northwest of the present-day town of Gauaschach. The opposing forces are positioned in a valley in the area of the present-day town (Gauaschach Sebastiansstraße measurement point). Rome's opponents are to be identified as Celtic-Greek. The coordinates **Lokoriton** and **Segedonon**, with which the measurement point is linked, are Celtic. The coordinates **Graunionarion, Menosgada, Toullon 1, and Laktron 2** are Doric-Greek.

Part VI Linguistic Features

Since the coordinate designations, alongside the mention of toponyms in literary texts and a few inscriptions, are the only written references to the linguistic conditions of this period in the geographical area between the Seine, Rhône, and Elbe rivers, it is essential to draw upon insights from historical linguistics for their interpretation. In addition to older works from the 19th and 20th centuries, recent studies—particularly those by Negrè and Delmarre, as well as Scheungraber and Grünzweig—provide guidance in this regard. This study employs precise localization, combined with the interpretation of certain morphemes in the designations and an examination of multilingualism in coordinate designations and place names, which facilitates a better understanding of the text.

It is helpful for understanding the coordinate designations that the text frequently uses terms from the fields of hydrology and seafaring. Certain morphemes that convey spatial orientation are also frequently present. The reliability of interpretation improves when designations are available in multiple languages. This provides a foundation for interpretation in conjunction with very detailed localization.

Information regarding affiliation with a language group can be found in the explanations for the respective coordinates. A systematic examination of linguistic conditions is not the intention of this work, but some insights do emerge. For instance, the Greek language must have been more widespread in the area between the Seine, the Rhône, and the Elbe than was previously recognized. A number of coordinate names can be partially traced to Greek etymologies, such as *Kastellon*, a crasis of the likely Punic term ka- or ka-t- for *ship*, combined with a Germanic or Greek suffix, as in the Greek Στέλλω (*stello*), meaning *to equi*” or *to put in order*. In German: *to manufacture* or *to place in the sense of positioning*. The meaning of *Kastellon* is thus *shipbuilder*, and the measurement point for this is the town of Kleve on the Lower Rhine, where Punic, Greek, and Germanic linguistic influences intermingled.

Toullon, the polis of the Lakoi and today’s Toul, also exhibits a blend of Germanic and Greek linguistic influences. Toullon is a *krasis* formed from the Germanic *tou-* / *to-* (meaning *where* or *toward*) and the Greek ἄλλος, *allos*, meaning *other*, *others*, or *toward the other*. Caesar’s comments on the Gallic War can also be cited as evidence of the use of Greek.¹⁴⁷ Caesar reports that the Helvetii used the Greek scripture.

¹⁴⁷Gaius Iulius Caesar, *De bello Gallico*, I,29,1 Lateinisch-Deutsch,übersetzt und kommentiert von Marieluise Deißmann, Ditzingen 2023: 53.

The locative prefixes *ou-*, *ve-*, *a-*, *ta-*, *tou-*, *bi-* in coordinate designations

The *ou-*, *ve-* prefix

Numerous coordinate designations contain a morpheme that refers to the location of the place. One such morpheme is the Greek prefix *ou-*. *Ou-* occurs with the meaning *where*, but in the sense of a relative pronoun and not as an interrogative word. Thus, the coordinate *Ou-ἰ-σοῦντιον*, *Ou-i-sountion*, is to be understood literally as *where I-sountion [is]*. The locative prefix is followed by the name of the place; the place name in the strict sense is *i-sountion* or *-sountion*.

In addition to *ou-*, *ve-*, *a-*, *ta-*, *tou-*, and *bi-* are also used as locative prefixes.

In Latin, the locative prefix corresponding to the Greek *ou-* is *ve-* or *vi-*. *Ouisountion* is Latin *Vesontio* or *Visontio*, *Ve-sontio* or *Vi-sontio*. The modern names of the measurement points belonging to the coordinate *Ouisountion* are *Vesoul* and *Besançon*, cities in France.

In Germania, the coordinate for the Weser River is designated with the Greek *Ουῖσουρίγιος*, *Ou-i-sourigios*. The literal meaning is *where the river I-sourigios [is]*. The Latin form is *Vi-surgis*.

Another example is *Αυγούστα οὐινδελικῶν*, *Augusta Ou-indelikon*, meaning *where Indelikon [is]*; according to Pliny the Elder, the ethnic name is *Vindelici*.¹⁴⁸ The name can only be reconstructed in a modern place name through indirect means (see entry *Augusta Ouindelikon*).

The following also belong to the same interpretive context:

Ouetorra	Ou-e-tor-ra, Latin: Ve-tera,
Ou-e-ger-ra	Ou-e-ger-ra, Latin: Ve-tera
Ou-i-kos	Ou-i-kos, Lat. Vi-cus,
Ou-ἰσιουλα []	Ou-i-sioula, German: Vistula (river).
Argento-ou-aria	Latin: Argento-va-aria

The *a-* prefix

The locative prefix *a-* is found in Greek *Α-λίσο*, *A-liso*, or *Ἀλσισον*, *Alsison*, with *-li-* denoting a body of water and *-so* further qualifying the body of water. The meaning of *A-li-so* is thus *where the river [is]* or *toward the river*. According to reports by ancient authors, a Roman military camp named Aliso is said to be located on the right bank of the Rhine; a location on this river, the Sieg, can be assumed.

¹⁴⁸ C. Plinius Secundus d. Ältere, *Naturkunde*, Bücher II-IV, Lateinisch-Deutsch, hrsg. v. Winkler, Gerhard, III, 136: 96.

The *ta-*, *tou-* prefixes

Ta- and *tou-* are locative prefixes meaning *where*, *there*, or *thereward*. This meaning of the locative prefix *ta-* is convincingly demonstrated by *Τα-δερίον*, *Ta-derion*. The coordinate links to a distance interval with eleven measurement points, which are the battle sites. The meaning of *Ta-derion* is therefore *where the battle [was]* or *site of the battle* (see the entry *Taderion*).

Tou-λλον, *Tou-llon*: The name is a *krasis* of the Germanic *to* (*toward something*) and the Greek *ἄλλος*, *allos*, meaning *other*. Another possible derivation is from the Germanic *to-* and the Greek *ἄλλοιόω* (*alloio*), meaning *to change*. Furthermore, a formation from the Gallic *allos*¹⁴⁹, meaning *other*, is possible. The meaning in all three variants is *toward the other* or, figuratively, *place of change*.

The name derives from a settlement or a boundary of the Lakoi ethnic group's territory, which ran near the town of Thunimont. A stream there was still called Tolloire in the 19th century. This is where the transition lies between the Doubs/Rhône river systems with their tributaries to the south and the Moselle/Meuse/Rhine systems to the north. To the north lay the territory of the Lakoi, to the south that of the Sequanii. *Tou-[a]llon* is to be understood as a place where one crossed between the territories or the river systems. The original meaning is likely to have been lost by Roman times at the latest. The name survives in the late antique *Tullo*¹⁵⁰, today's city of Toul.

In the case of *Τουλιφουρδον*, *Toulifourdon*, the suffix *-fourdon*, according to SCHEUNGRABER / GRÜNZWEIG, is Germanic¹⁵¹ with the meaning *river ford*. *Tou-li-fourdon* therefore means *toward the river ford* or *place of the river ford*. The measurement point is located on the Elbe River, so it refers to an ancient crossing over the Elbe. In the 11th century AD, the place name was *Tuinunfliet*; the current place name is *Twielenfleth*¹⁵².

Li- means a *body of water* or a river; compounds with *li-* are of an archaic nature (see entry *on water-related words beginning with li- / lou- / le- / la-*). It must be acknowledged that the derivation for *tou-* from an Indo-European root **tu*, as demonstrated by SCHEUNGRABER / GRÜNZWEIG, is also possible here in the context of *to swell* for a tidal river. However, the root **tu* must be supplemented with a water particle *-le- / -li-* to arrive at the meaning of *to swell*, as the examples used by SCHEUNGRABER / GRÜNZWEIG also clearly demonstrate. Gr. *τύλη* and the *touli-* mentioned here can certainly be understood as *to swell* or *to expand*.

In each individual case, one must compare whether *to swell* or *there* is more plausible.

¹⁴⁹ DELAMARRE, XAVIER: 39.

¹⁵⁰ Notitia Galliarum 4./5. Jh. n. Chr., zit. nach SMITH, WILLIAM (Ed.) Dictionary of Greek and Roman Geography, Vol II, London 1857: 1239.

¹⁵¹ SCHEUNGRABER / GRÜNZWEIG: 347.

¹⁵² Hamburgisches Urkundenbuch, 4 Bde, Bd. 1, hrsg. von LAPPENBERG, JOHANN MARTIN, Hamburg 1842: 80.

The -bi- prefix

A locative prefix that occurs rarely here but was widely used is the locative prefix *-bi-* with the meaning *where*. The name of the Treveri in the coordinate designations attests to this meaning. According to Cod. Vat. Gr. 177 and Cod. Vat. Gr. 191, the name of the ethnic group is Tri-bi-r-oi; the Latin variant is Tre-ve-rer. *-bi-* and *-ve-* are therefore equivalent in meaning. The locative prefix is also found in **Bi-kourgion**, meaning *where Kourgion is*. The coordinates **Ouarouaria 1,2** correspond to the measurement point **Bribir Kiceri** in present-day Croatia; here, *-ou-* and *-bi-* are equivalent in meaning.

The linguistic preservation of the prefix group

It cannot be overlooked that there is a close connection to modern forms with the same semantic field. The similarities are clear.

<u>Language</u>	<u>Ancient place prefixes</u>
<u>French</u>	
ou, German <i>wo</i>	ou-
à, German <i>toward something</i>	a-
<u>English</u>	
where, German <i>wo</i>	ve-
to, <i>toward</i>	tou-
<u>German</u>	
zu, <i>zu etwas hin</i>	tou-
bei	bi-
<u>Latin</u>	
ubi, Eng. <i>where</i>	ou-, bi-

Place names in several languages with similar meanings

In some cases, place names and their associated coordinate designations are based on the same or very similar meanings, albeit in different languages. This is the case, for example, with the town of Heilsbronn. The coordinate associated with it is **Deouona**. Etymologically, Deouona can be interpreted in Greek as the place of the sleeping or dreaming goddess; in German, Heilsbronn means *sacred spring*. Both terms refer to a sacred place in a specific context, albeit in different languages.

The situation is similar with the **coordinate Mattiakon** and the place names Wiesbaden and Wieseck. The coordinate **Mattiakon** is linked to measurement points to which the place names Wiesbaden and Wieseck are assigned. The meaning of *Matt-* / *Matti-* in the 20th century is

meadow, particularly a mowed meadow. Today, the term is widespread in German-speaking Switzerland for mountain meadows. At the beginning of the 20th century, it was also widespread in Alsace and Baden¹⁵³. *Matt*- and *Wies*- are therefore synonymous in their basic meaning (see also the entry *Mattiakon* for further details). The linkages of the coordinate **Mattiakon** with measurement points on *Wies*- indicate the synonymous usage even in ancient times.

Regarding the coordinate **Drakuina** and the place name Ravensburg. Since an interpretation of *-kouina* as the bird *night owl*, according to Latin and Celtic *cavannus*, is plausible¹⁵⁴, the meaning of the bird *raven* in Germanic and *night owl* in Latin/Celtic is present (see the entry for *Drakuina*).

The coordinate **Botamodouron** refers geographically to the present-day town of **Katwijk**, and both names are based on the same meaning. The meaning of *Ka- / Kat-* derives from *bot-* with the meaning of *boat, ship* (see the entry for *Botamodouron*). *-Amo-* can be derived from the Greek *ἄμμος* (*ammos*), meaning *sand*, referring to a place where ships were pulled onto the sand; linguistically simplified, a *boat landing site*. For *-wijk*, the meaning can be inferred as a *landing site*.

The occurrence of place names with the same meaning in different languages can best be explained by a mixed linguistic landscape in which places with speakers of different languages were located in close proximity to one another, and place names were translated into the respective language. The existence of a highly mixed linguistic landscape is also indicated by coordinate designations composed of elements from different languages, such as **Kastellon**.

Ultimately, it is also possible that changes occurred within a mixed linguistic landscape, altering the population structure and language, while the meaning of place names was preserved in the new names.

Hydronyms

Water-related words ending in *li-* / *lou-* / *le-* / *la-*

SCHMIDT¹⁵⁵ has demonstrated that water body names ending in *-li-* within Old European hydronymy can be traced back to Greek etymology and already possess an archaic character in Greek. The distribution of water body names ending in *-li-* is found in pre-English water body

¹⁵³ MÜLLER, ELISABETH, *Matte = Wiese im Sprachgebiet des Deutschen Reiches*, in: *Zeitschrift für deutsche Mundarten*, 1./2. 1923, Berlin: 87–92.

¹⁵⁴ *Vergleichendes Wörterbuch der Indogermanischen Sprachen*, hrsg. von Pokorny, Julius. Band 1, Seite 331. Berlin, Leipzig 1930.

¹⁵⁵ SCHMIDT, WOLFGANG P., *Das Griechische und die alteuropäische Hydronymie*, in: *Linguisticae Scientiae Collectanea*, *Ausgewählte Schriften von Wolfgang P. Schmidt*, anlässlich seines 65. Geburtstages, hrsg. von Udolph, Jürgen u.a., Berlin und New York 1994: 167–174.

names in Britain and the Baltic region. They have been incorporated into coordinate descriptions as names presumably used long before. In Greek itself, *-li-* is used in connection with seafaring, such as *Λιμὴν*, *limēn*, meaning *harbor*, and variants of *αλί-*, *ali-*, *αλιεύς*, *alieus*, meaning *sailor*, *αλι-κρείων*, *ali-kreion*, meaning *lord of the sea*, etc.

The use of *-li-* for bodies of water is not limited to Europe. PELLEGRIN cites *ilel* as an archaic term for water in regions of Algeria and Tunisia¹⁵⁶ and refers to Hesychius, according to whom “*lilu*” was used as a word for flowing water in Libya.

“In the Djebel Nefousa, in Djerba, in the Djerid, ‘*ilel*’ refers to the sea, while ‘*silel*’ in Tuareg is a mirage; ‘*il*’ in Zenaga is a river”¹⁵⁷.

Li- / le- does not appear to be Celtic / Gaulish, but there is the Celtic / Gaulish *lo- / la-* for river and water; the coordinate **Lokoriton** with the measurement point **Lohr** at the mouth of the Lohr River where it flows into the Main demonstrates this, as does **Λάβτιο**, **Labio**, according to Cod. Vat. Gr. 191 one of the names for the Elbe River. In Gaulish, *-la-* is found in *late* for *swamp* and in *lautron* for *bath*.¹⁵⁸

For the area between the Seine and the Elbe, a designation *li- / lou- / le- / la-* for bodies of water is attested multiple times in the coordinate descriptions. In Germania, these places are found primarily north and south of the Lower Elbe and in the Alpine region:

Λεφάνα, λάφανα
Lefana, Lafana

Measurement point
Suederbrarup, Angelnstrasse (Thorsberger Moor)

The measurement point is located north of the Lower Elbe. KRAHE has examined Tacitus’s account of a Germanic goddess named *Tamfana*¹⁵⁹ and concludes that the suffix *-fana* denotes the deity, specifically a goddess.

A measurement point corresponding to the coordinate **Lefana 2** is located in the village of Suederbrarup on Angelnstrasse. Thorsberger Moor is situated a short distance away. The suffix *-le / -la* suggests a connection to water or a moor. Since *-fana* refers to a goddess, the name Lefana / Lafana means *water goddess*.

Toulifourdon, Toulisourgion, Askaliggion, Louppia

The measurement points for these coordinates are primarily located in the Lower Elbe region. Measurement points for Toulifourdon and Toulisourgion are situated directly on the Elbe River,

¹⁵⁶ PELLEGRIN, ARTHUR, *Essai sur les Noms de Lieux d’Algerie et de Tunisie*, Tunis 1949: 40.

¹⁵⁷ PELLEGRIN, ARTHUR: 64.

¹⁵⁸ DELAMARRE, XAVIER, *Dictionnaire de la langue gauloise*, 2. édition, Paris 2003: 196, 198.

¹⁵⁹ KRAHE, HANS, *Tamfana*, in: *Beiträge zur Geschichte der deutschen Sprache und Literatur*, Jahresband 58, Halle a.d. Saale 1934: 282 – 287.

while those for Askaliggion and Louppia are on the Elbe's tributaries. Since Louppia is a generic term for calm rivers, measurement points for Louppia can also be found in other locations.

Augousta Ouindelikon, Lukian, Likios / Likatioi, Rodanou Kaloumenen Limenen

In the Alpine region, there are measurement points on rivers or on *Lake Geneva (Lac Lemman)* corresponding to the three coordinates. The measurement points for Augousta Ouindelikon are located on the Inn and the Lech; the measurement point for the Lukian River is on the Lech; and the measurement point for the Rhône River is on Lake Geneva.

Aliso, Alsison

The only mention outside the aforementioned areas is found on the Sieg River, a tributary of the Rhine. A measurement point is located in the city of Siegburg, on the Sieg River. *-Li-* is found in *A-li-so*.

Water-related words ending in -ra- / -ru- / -ri-

The water names ending in *-ra- / -ru- / -ri-* are found in *Rufiana* (mouth of the Ruwer River), *Arar* (Saône), *Argentoraton* (Graffenstaden near Strasbourg), *Raurikon Augousta* (Augst and Basel), *Ouetorra* (mouth of the Roer/Rur River into the Meuse), *Ourida* (Neckar River).

The meaning of *-ra- / -ru- / -ri-* is to flow, to stream, as seen in the Greek *ρέω*. The root is *ρε-*, *ρυ-*, Sanskrit *sru*, *sravami* (to flow), *sravas*, *srotas* (river)¹⁶⁰. Greek also *ρευμα* – German *fließen*, *Strom*, *Fluss*; Latin *rigo* – German *nass*, *Regen*; English *rain* – German *Regen*.

Water-related words with -sou- / -sa- / -si- / -se-

In the coordinate descriptions, *-sou- / -sa-* appears, among others, in *Ouisourigios* (the *Weser* and *Söse* rivers), *Ouisountion* (*Besançon*), *Toulisourgion* (*Lauenburg on the Elbe*), *Mesouion* and *Morsouion* (location unknown), *Setuakoton* (location unknown), *άλπεων ρέουσai*, *alpeon reousai*, (Alpine streams, rivers). It also appears at the beginning of coordinate designations, in *Σουῖβου ποτου[]*, *Souibou Potu*, Latin: River *Suebus* (probably the River *Oder*).

In France, the variants *-se- / -si-* occur in *Sekoana* (the rivers *Seine*, *Seille*, and *Saône*) and in *Nasion* (location ambiguous).

In German linguistics, KRAHE argued that the meaning of *ser- / sor-* is “to flow, to stream”¹⁶¹. As shown by the examples he selected, a different result emerges when the examples are analyzed as I believe is correct. KRAHE cites Old Indian *saráh* – liquid, *sará* – river, *sármah* – the flowing, *sarit* – stream, *saranah* – flowing; Greek *ορός*, Latin *serum* – milk fluid. From this,

¹⁶⁰ LIDDELL: 1423.

¹⁶¹ KRAHE, HANS, *Our Oldest River Names*, Wiesbaden 1964: 40.

he derives the meaning *to flow, to stream* for *sor- / ser-*. This meaning is contained in the words, as will be shown in, but not because of *sar- / ser-*, but because of *-ra- / -ri- / -ro- / -ru-*. This morpheme carries the meaning of *to flow, to stream*. This is shown by the Greek *ῥέω*, *to flow, to stream*, as well as the derivations of *ῥέω* (see above). The breakdown must therefore look like this: *sa-rá-h* – liquid, *sa-rá* – river, *sá-rma-h* – the flowing, *sa-ri-t* – stream, *sa-ra-nah* – flowing, Greek *ο-πο-ς*, Latin *se-ru-m*.

Based on North African nomenclature, PELLEGRIN concludes that *-sou- / -su-* is to be understood as a valley or depression, but also as a river¹⁶². For *-sou- / -sa-* with the suffix or prefix *-ra-*, it therefore makes sense to interpret it as a valley filled with water (or with a flowing substance).

The interpretation of a valley or lowland filled with liquid is supported by *-si- / -se-* with the meaning of a vessel in Latin *situla*, German *Eimer*, *Urne*, German *Seidel*, French *seille*, *seau*, German *Eimer*, Portuguese *selha*, German *Eimer*, *Wanne*¹⁶³. The French word *source* for *spring* may be derived from the morpheme *-sou-*. NÈGRE considers *source* to be possibly pre-Celtic¹⁶⁴.

Designation *ka- / kat-* for ship

I have already shown that the present-day town of Katwijk appears in the coordinates under the name **Botamodouron**. These are synonymous terms, and *Kat-wijk* therefore means *boat landing place* or, linguistically simplified, *boat harbor*.

There is ample evidence of the widespread use of *ka- / kat-* to denote a ship in Europe; for example, *ka-* appears in *Carabus* (Latin) and *κάραβος* (Greek), a type of boat made of woven wicker and covered with animal skins, as well as in *Kanu* (German), *Canoe* (English), *kayak* (Icelandic: *Qajaq*), *Kahn* and *Kogge* (Low German), *Καϊκή* (Greek, a traditional fishing boat), *kayık* (Turkish), *Каюк*, *kajuk* (Rus., a traditional riverboat from the Don), *Caravela* (Portuguese / Spanish sailing ship), outside Europe in *catamaran*, and also in maritime terms such as *captain*, *cabin*, *canal*, *quay*, *cape*, and *caulking*.

Regarding the Indo-European languages¹⁶⁵, AUGUST FICK provides no indication that there was a word *ka- / kat-* for ship in the Indo-European languages; its absence is evident not only in Greek and Latin. The term *ka- / kat-* for *ship* must have developed outside the Indo-European languages and been borrowed from there.

The word used for *ship* in Ancient Greek is almost exclusively *ναύς*. A form with *ka-* occurs in certain contexts. For example, *ka- / kat-* appears in *κατάγω*, meaning to bring *a ship from the*

¹⁶² PELLEGRIN: 67.

¹⁶³ KLEIN, ERNEST, A Comprehensive Etymological Dictionary of the English Language, Vol. 1, Amsterdam, London, New York 1966: 1408, 1451.

¹⁶⁴ NÈGRE, ERNEST, Place Names in France, 2nd ed., Paris 1977: 18.

¹⁶⁵ FICK, AUGUST, Comparative Dictionary of Indo-European Languages, Part One, 2nd edition, Göttingen 1870, and Part Two, 4th edition, Göttingen 1894.

open sea to land / into port, and in related expressions . Its use is attested in the *Odyssey*¹⁶⁶. Terms for commercial practices include *καταγοράζω* – *to buy up*, *καταγορασμός* – *purchase with borrowed money*, and *καταγορτεύω* – *to deceive*, each of which relates to maritime trade via the prefix. OTTO SCHRADER¹⁶⁷ cites for *Ka-* / *Kat-* the Greek / Latin *Katascopus* as a type of ship, which can be translated as a reconnaissance / spy ship and does not necessarily refer to a type of ship used by the Greeks. With a similar meaning, Greek has the verb *κέλλω* (used in the *Odyssey*), derived from the root *κελ*, Sanskrit *kal*, *kalyami*, meaning *to bring forward, to bring a ship ashore, onto the beach*. The borrowing of *ka-* and *ke-* from a non-Greek source must have taken place early on and had already occurred by the time the *Odyssey* was written.

The close linguistic connection between a term for a ship and associated pejorative trade practices points to the non-Greek origin of *ka-* / *kat-*. The wording makes it clear who is meant. The term *κατάγο* is used to describe Carthage and Punic-Phoenician trade practices from a Greek perspective. This attribution makes it clear that the line of transmission for *ka-* / *kat-* must have run through the Phoenician or Punic language at a certain point in time.

Another name for *Carthage* among the Greeks was *Καρχηδων* (Karchedon), likely a *krasis* of *κα-* / *κατ-*, *αρχή*, and *δών*, with the meanings ship for *Ka-* / *kat-* and *power* or *rule* for *Ἀρχή*. In summary, *rule by ship*.

In the study area, the coordinate **Karchedon** links to the measurement points **Cambrai Place du 9 Octobre**, **Katwijk** Hoorneslaan, and **Kleve Emmericher Strasse**. The initial sound *ka-* is present in *Cambrai* and *Katwijk* but has been lost in *Kleve*. The ancient name for *Kleve* derives from the coordinate **Kastellon**, which links to the measurement point **Kleve Emmericher Strasse**. When breaking down **Ka-stellon**, we find *ka-* for *ship* and *-stellon*, for which a Greek and Germanic etymology can be considered. Gr. *Στέλλω*, *stello*, Ger. *to equip something, to put in order*, Ger. *to manufacture something, to place* in the sense of positioning. The meaning of *Ka-stellon* is therefore *shipbuilder*. The name illustrates how a Punic linguistic element was incorporated into an Indo-European language.

All three measurement points, with the initial sound *ka-*, also linguistically point to Carthage; all three were involved in maritime trade with Carthage.

The names of two ethnic groups mentioned in the coordinate descriptions also contain *ka-* / *kat-*, namely the *καλειται*, *Kaleitai* (Cod. Vat. Gr. 191), *Καλλήτ[ι]*, *Kallet[ι]* (Cod. Vat. Gr. 191), an ethnic group of the Belgae also mentioned by Caesar, and among the *Likatíoi*, an ethnic group that lived along the present-day *Lech* River. *Lei-* / *le-* / *li-* is certainly a term for a body of water or a river; *Ka-* / *kat-* in connection with this yields the interpretation *lake* or *river boatman*, which likely refers to navigation on the middle and lower reaches of the *Lech*.

¹⁶⁶ LIDDELL: 787.

¹⁶⁷ SCHRADER, OTTO, *Linguistisch-historische Forschungen zur Handelsgeschichte und Warenkunde*, Teil 1, Jena 1886: 46.

Phonetic features of the regional variety of Greek

The Greek language is present in the study area through the Greek text in which the coordinate descriptions are written. However, it is also present through place names that were Greek in origin before they were incorporated into the text.

Four Greek place names in the study area have undergone a sound shift that is very similar to the first Germanic sound shift and must therefore have taken place in the same geographical area. In this shift, the initial sound of the Greek words changed from *p* to *f*. *Poros* became *Foros*, *Proidios* became *Froidios*, *Pagaron* became *Fagaron*, and *Epinion* became *Efinion*. The forms with *p* correspond to the known Greek spelling, while those with *f* do not.

There is no evidence to suggest that the sound shift could have occurred anywhere other than in the study area, where a form of Germanic corresponding to that period was also spoken. As described, the coordinates were preserved and updated in Alexandria. It is impossible that a sound change could have occurred there specifically with these four coordinates, while other Greek-language designations were not affected by the sound shift.

Specifically:

The four Greek names *Froidios*, *Efinion*, *Fagaron*, and *Foros* have been transmitted with the Greek letter Φ and thus deviate from known Greek and Doric forms. They can be etymologized as Greek if Π is used instead of Φ.

Φροιδῖος ποτὺ εκβολαι, Φρούδιο ποτ εκβυλ: The name represents a *krasis* and is to be resolved as Πρων Ἰδῖος, *Pron Idios*, foreland of the *Idi* or *Iti*. Attested is πρων αλῖος, *Pron Alios*, foreland of *Ionia*.

Τισορῖακον ἐπίνειον Ρομονηρ, Γεσορίακ εψῖνιον: The Greek form is *Επινειον*, meaning *harbor* or *naval base*. The word is attested in Codices 177 and 191 with Π and with Φ.

Φόρος Τιβερίου, Φόρο Τίβεριο: *Foros* is the Varietic form of the Greek πόρος, *Poros*, meaning *path*, literally *the path of Tiberius*.

Φάγαρον, φεύγαρον: *Faga-* is a variety of the Doric παγά¹⁶⁸, Greek πηγή, meaning *source*. *Faga-* is thus based on the Doric *Paga-*.

The geographical region in which these features occur extends from the French coastal area north of the Somme to the area near Gravelines and Loon-Plage, then eastward to the Wasserkuppe in Hesse, where the Fulda River has its source, and into the Thuringian Forest to the source of the Emse River. In the south, the region extends into what is now Central Switzerland.

¹⁶⁸ LIDDELL: 1264.

A scribal error can be ruled out, as these are unusual forms for Classical Greek and there is no reason for scribes to replace known forms with unknown ones. Furthermore, the same error would have had to occur four times. In the area of Feuquieres en Vimeu north of the Somme River, several place names begin with *f*, so that the sound *f* is as well attested for a measurement point of the coordinate Froidios as is possible after 2.000 years.

Consequently, the Greek designations using Φ instead of Π must reflect features of the Greek language as it was used in the region. Accordingly, the Greek language underwent its own development here. A striking feature of this development—which dates more to the first century BCE than to the following century—is the parallel sound shift in Germanic. In Germanic as well, the sound P must have changed to an F sound. A very similar sound shift thus took place in both the Germanic and Greek languages of the region. Contact between speakers of both languages must have been intensive over a long period of time, and there must have been close local interaction between the two languages.

Changes can also be observed in coordinate names, where a hard consonant changes to a soft one. Prodentia derives from *Progentia*, and Douro- in Dourokottoron from the Greek Τύρα, meaning *door*. In Prodentia, the *g* has evolved into a *d*, and in Dour-, the Greek *t* into a Gallic *d*. The Gallic *doratia* and *duron* also contain *dor-* / *dur-* with the meaning of *door*¹⁶⁹.

Close linguistic contacts are also indicated by place names in which parts of the word can be traced back to Greek, while other parts originate from other languages. An example of this is Κάστελλον, Kastellon, where -στελλον, -*stellon*, can be traced back to both Greek and German. Gr. Στέλλω, *stello*, Ger. *to equip*, *to put in order*. Ger. *to manufacture*, and *stellen* in the sense of *placing*. A *krasis* forms the coordinate name Toullon, from *Tou-* and -*allon*. -*Allon* can be traced back to both Greek and Gaulish (see the entry for Toullon).

¹⁶⁹ DELAMARRE: 147, 156.

Appendix: Calculation of distance between coordinates

Calculation of the distance between two coordinates according to Thaddeus Vincenty.

Länge von Standort A: ϕ_A ,

Breite von Standort A: λ_A

Länge von Standort B: ϕ_B

Breite von Standort B: λ_B

$$\text{Abplattung der Erde } f = \frac{1}{298,257223563}$$

$$\text{Erdradius } a = 6378,137 \text{ km}$$

$$F = \frac{\phi_A + \phi_B}{2}, G = \frac{\phi_A - \phi_B}{2}, l = \frac{\lambda_A - \lambda_B}{2}$$

$$S = (\sin G)^2 \cdot (\cos l)^2 + (\cos F)^2 \cdot (\sin l)^2$$

$$C = (\cos G)^2 \cdot (\cos l)^2 + (\sin F)^2 \cdot (\sin l)^2$$

$$w = \arctan \sqrt{\frac{S}{C}}$$

The radians are required for w .

$$D = 2 \cdot w \cdot a$$

$$T = \frac{\sqrt{S \cdot C}}{w}$$

$$H_1 = \frac{3 \cdot T - 1}{2 \cdot C}$$

$$H_2 = \frac{3 \cdot T + 1}{2 \cdot S}$$

Distance s in kilometers:

$$s = D \cdot (1 + f \cdot H_1 \cdot (\sin F)^2 \cdot (\cos G)^2 - f \cdot H_2 \cdot (\cos F)^2 \cdot (\sin G)^2)$$

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