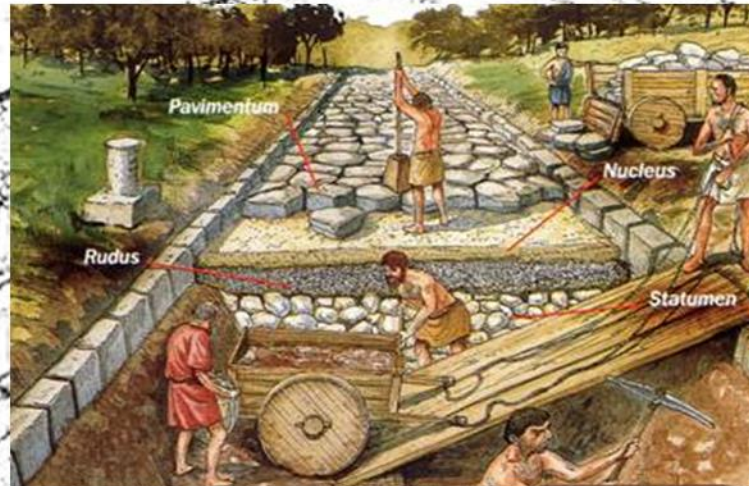




The engineering of ancient Roman roads

29th of September 2015 - h. 17,30 BRUSSELS



Logistics in the Roman Empire

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AIPSS - Italian Association of Road Safety Professionals

- 1 armilla
- 2 volta
- 3 spalla
- 4 rinfiacco
- 5 cappa
- 6 riempimento
- 7 parapetto
- 8 pavimentazione



The emperor, “head of state”, pontifex maximus and commander-in-chief of Rome was the centre of the centre.

He is in charge of the frontiers: the very heart is in direct control of the farthest parts.

Augustus

The Roman legions are the “long arms” of the centre in the remote and dangerous provinces

33 Legions (182,000 legionaires) for the control of the whole Empire (plus navy 40,000; auxiliaries 250,000 - Praetorian guard and others in Rome 20,000)



THE ROMAN LEGIONS BY THE END OF SEPTIMIUS SEVERUS' RULE
Circa 211 AD

- 20 Roman Legion
- Land, fluvial borders
- Imperial Capital

Mapping by Jack KEILO, 2014, Université Paris IV Sorbonne
centrici.hypotheses.org

Sources: livius.org, "Liste der römischen legionen" on Wikipedia, Notitia Dignitatum.

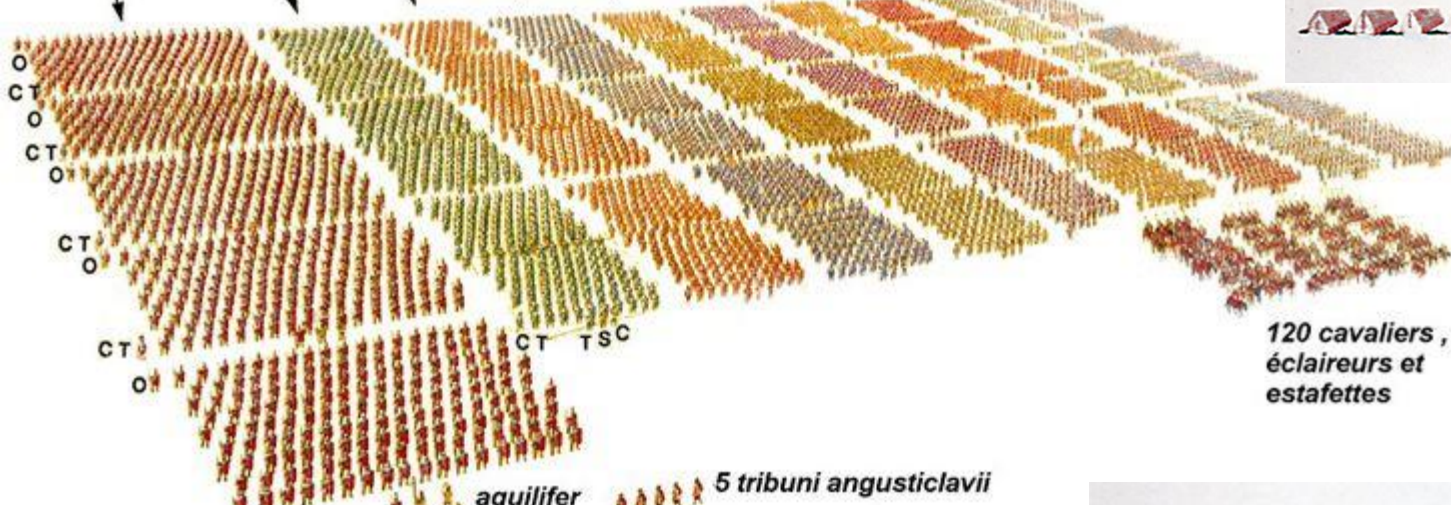
Background reference map is property of Ancient World Mapping Center 2011, info and licence: awmc.umc.edu



Names of the Roman legions
(See location on the map)

- 1 I Adiutrix, Lower Pannonia
- 2 I Italica, Lower Moesia
- 3 I Minervia, Lower Germany
- 4 I Parthica, Mesopotamia
- 5 II Adiutrix, Lower Pannonia
- 6 II Augusta, Upper Britain (Caerleon)
- 7 II Parthica, Italy
- 8 II Traiana, Noricum
- 9 II Traiana, Egypt
- 10 III Augusta, Numidia
- 11 III Concor Italia, Raetia
- 12 III Cyrenaica, Arabia
- 13 III Gallica, Syria Phoenice
- 14 III Parthica, Mesopotamia
- 15 IV Flavia Felix, Upper Moesia
- 16 V Scythica, Syria Coele
- 17 V Macedonica, Upper Dacia
- 18 VI Ferrata, Syria Palaestina
- 19 VI Victrix, Lower Britai, Eburacum (York)
- 20 VII Claudia Pia Fidelis, Upper Moesia
- 21 VII Gemina, Nearer Spain
- 22 VIII Augusta, Upper Germany
- 23 X Fterensis, Syria Palaestina
- 24 X Gemina, Upper Pannonia
- 25 XI Claudia Pia Fidelis, Lower Moesia
- 26 XII Fulminata, Cappadocia
- 27 XIII Gemina, Upper Dacia
- 28 XIV Gemina Martia Victrix, Upper Pannonia
- 29 XV Apollinaris, Cappadocia
- 30 XVI Flavia Firma, Syria Coele
- 31 XX Valeria Victrix, Upper Britain (Chester)
- 32 XXII Primigenia, Upper Germany
- 33 XXX, Ulpia Victrix, Lower Germany

cohorte 1 cohorte 2 cohorte 3 cohorte 4 cohorte 5 cohorte 6 cohorte 7 cohorte 8 cohorte 9 cohorte 10



primus pilus CT praefectus castrorum aquilifer T S C 5 tribuni angusticlavii legatus tribunus laticlavii

ct: centurion t: tesserarius s: signifer
 o: optio c: cornicem

LEGIONARY ORGANISATION

MEN = TENT PARTY
 THEY SHARE A TENT, WHICH IS CARRIED WITH THE CAMP KETTLE & MILLSTONES BY A MULE, & IN BARRACKS TWO ROOMS FOR EQUIPMENT & SLEEPING

TENT = 1 CENTURY
 PARTIES (80 MEN)
 COMMANDED BY A CENTURION

120 cavaliers, éclaireurs et estafettes

CENTURIES = COHORT (480 MEN)

A LEGION HAD 10 COHORTS

BUT THE FIRST COHORT CONSISTED OF SIX DOUBLE CENTURIES (960 MEN) AND THERE WERE ALSO 120 HORSEMEN

TOTAL FIGHTING STRENGTH 5400 MEN

The study of military logistics begins with the needs of the individual soldier and of the army's animals.

Imperial legion's estimated daily grain rations:

dry modii per standard legion 600 = 4200 Kg

*The **modius** was a Roman dry measure used primarily to measure out flour and **grain** (1 modius = 8,45 liters = approx. 7 kg)*

The Roman legionary was probably the first soldier in history to carry, not only his personal equipment, but also additional equipment.

Marching with their packs and equipment was an important part of Roman military training:

Twenty Roman miles (18.4 miles/29.6 km) in five hours (*)

(*) *Publius Flavius Vegetius Renatus : De Re Militari*
Late fourth century A.D.



Caesar marched from Rome to Spain in 27 days although, according to Appian “he was moving with a heavily-laden army”

“There is some reason to think, that the legionary troop train was made up entirely of pack-animals, and that wagons were used only between campaigns by the army train”.

(J. P. Roth: The Logistics of the Roman Army at War)



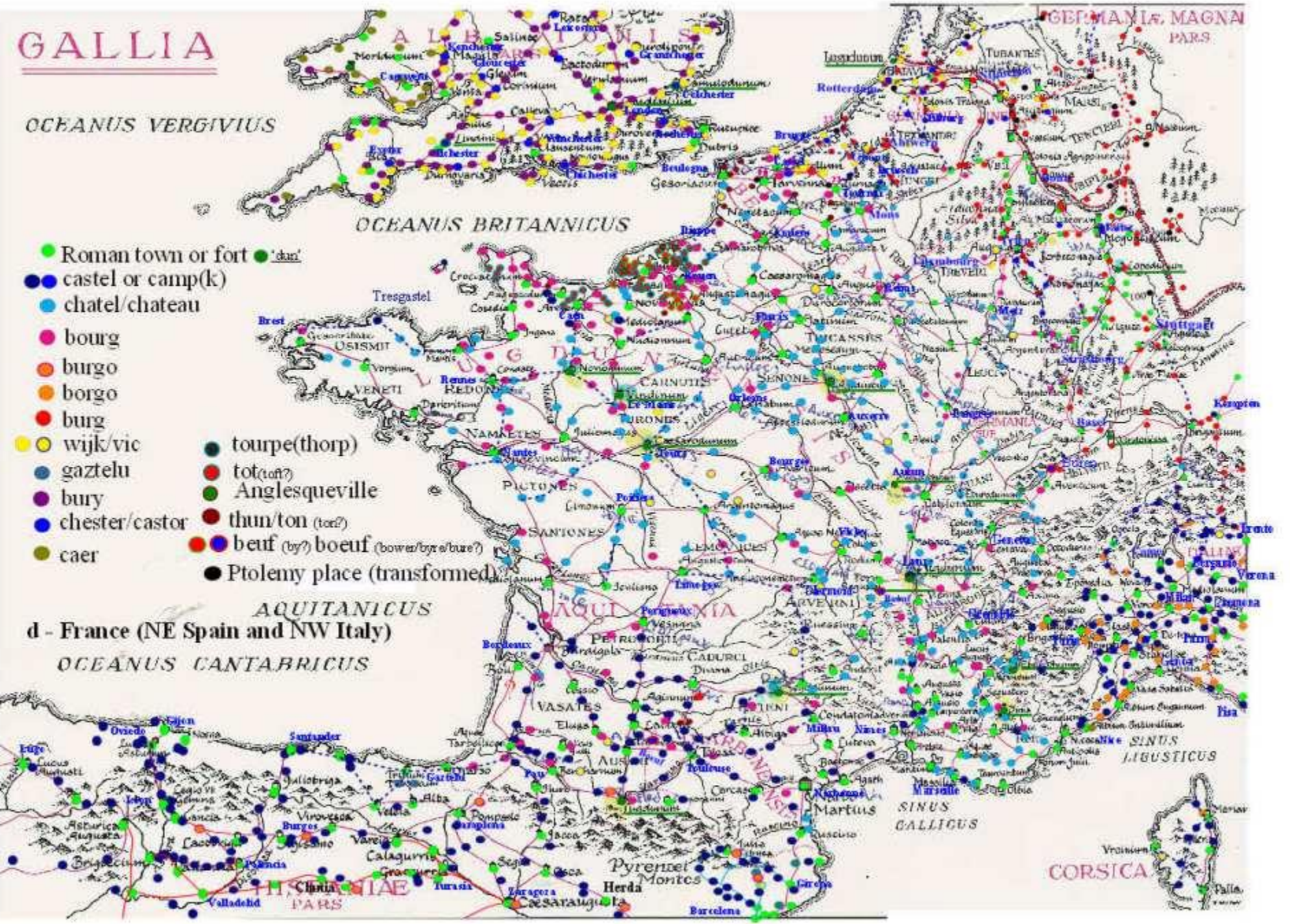
GALLIA

OCEANUS VERGIVIVUS

- Roman town or fort ● 'dun'
- castel or camp(k)
- chateu/chateau
- bourg
- burgo
- borgo
- burg
- wijk/vic
- gaztelu
- bury
- chester/castor
- caer
- tourpe(thorp)
- tot(ton?)
- Anglesqueville
- thun/ton (ton?)
- beuf (by?) boeuf (bowes/byr/bure?)
- Ptolemy place (transformed)

d - France (NE Spain and NW Italy)

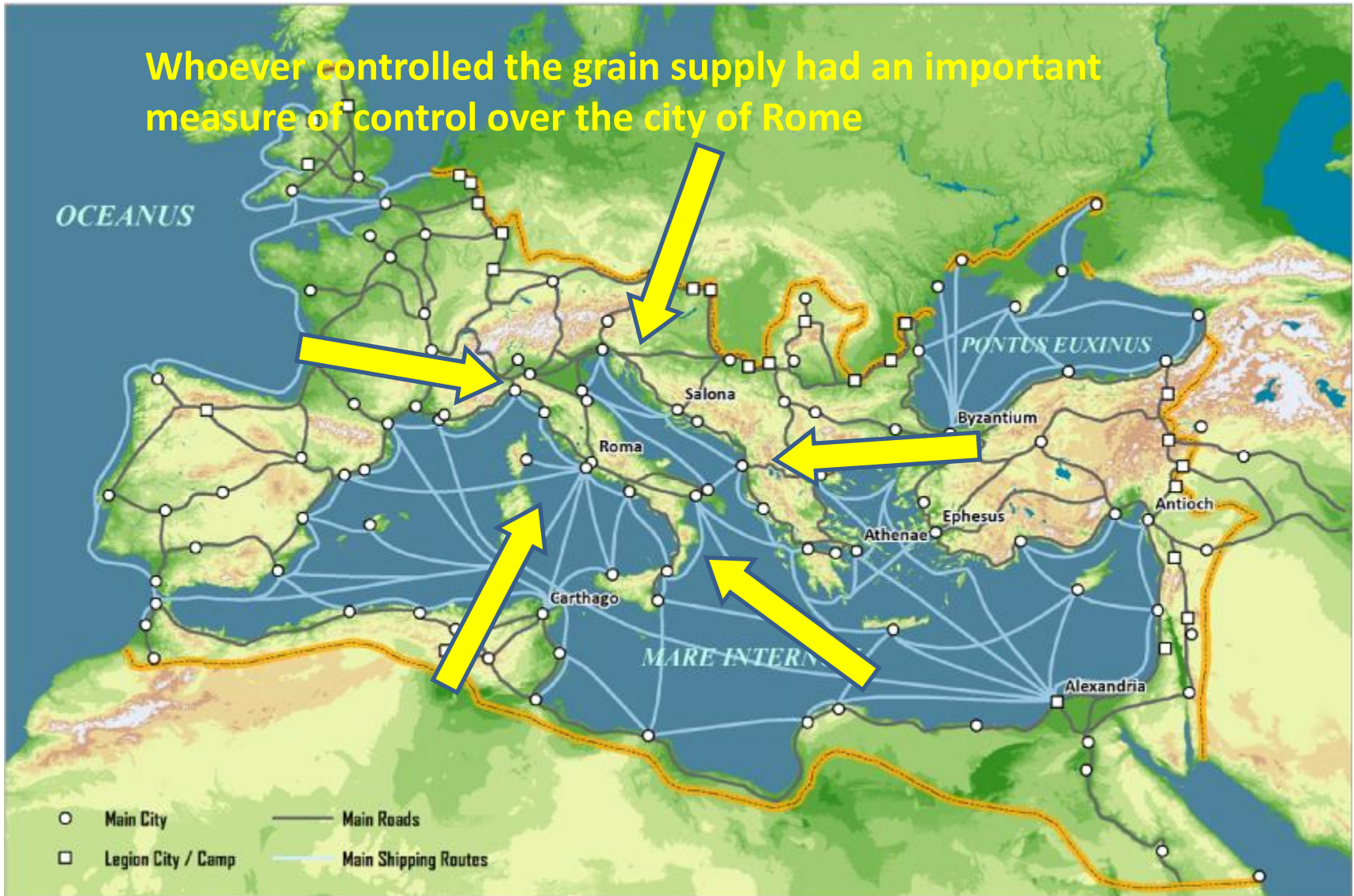
OCEANUS CANTABRICUS



CORSICA

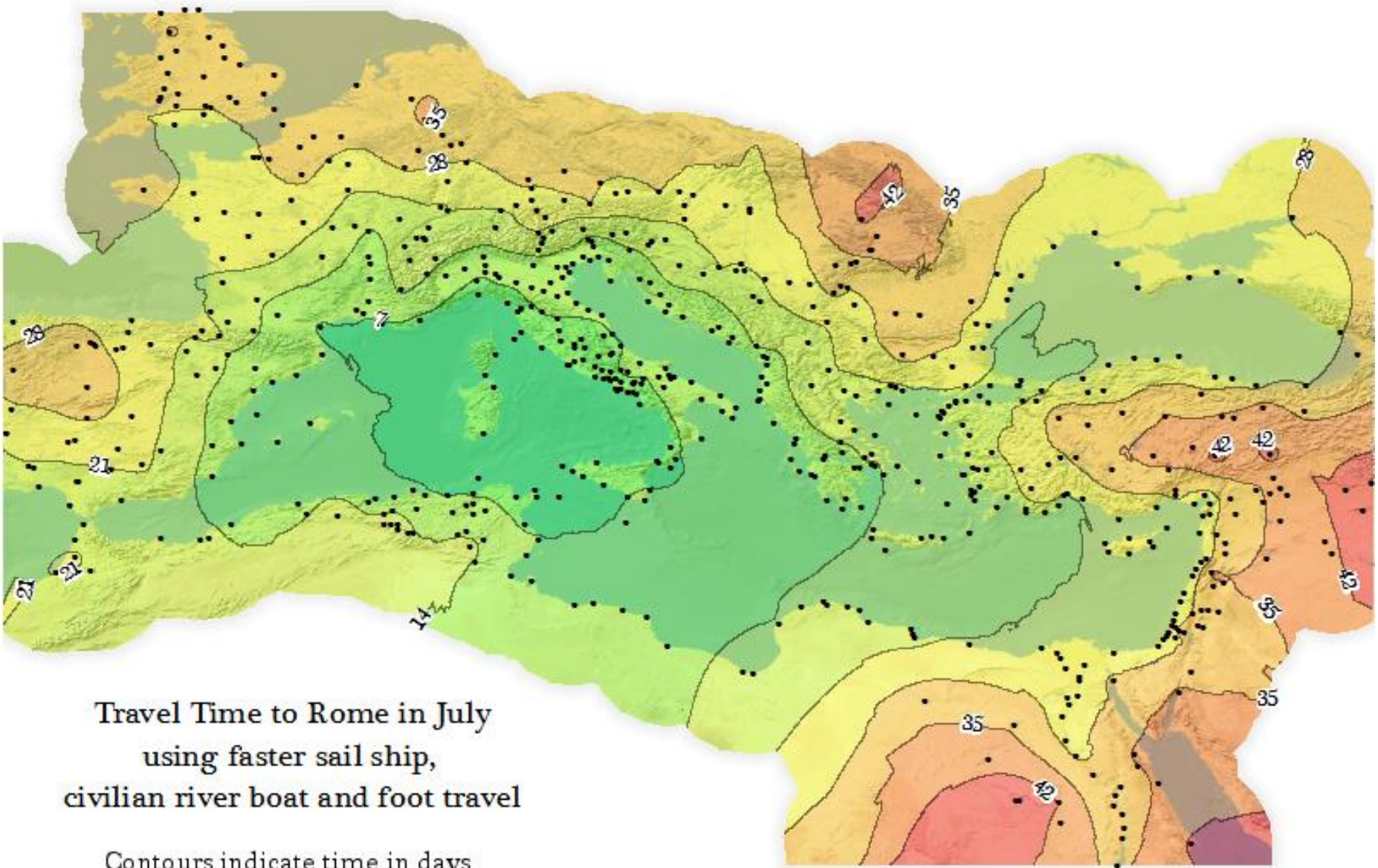
**Estimated annual provision of grain for Rome (Imperial times): up to 300,000 tons;
plus wine, oil etc.**

**Whoever controlled the grain supply had an important
measure of control over the city of Rome**





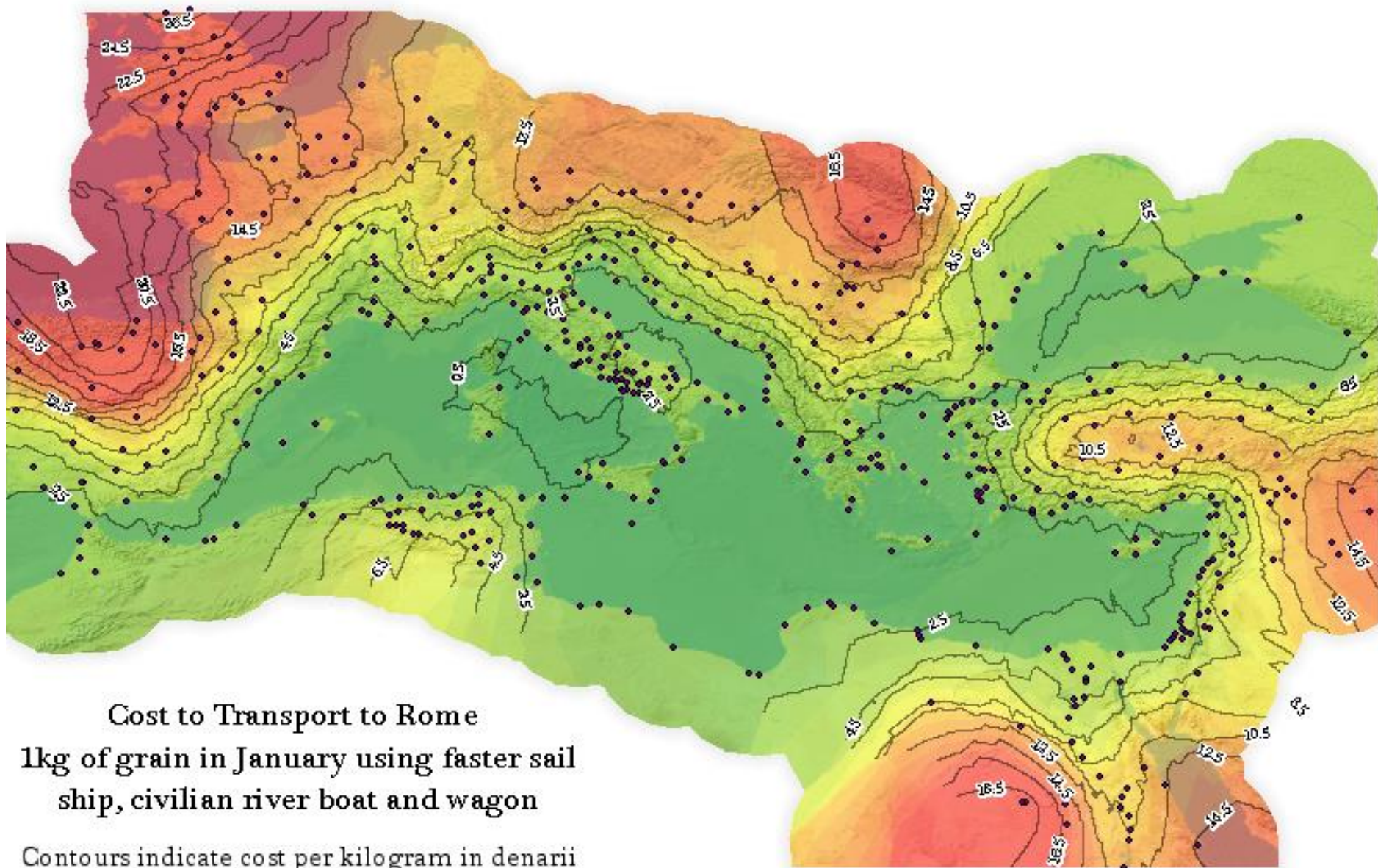
Cost, rather than distance, is the principal determinant of connectivity.



Travel Time to Rome in July
using faster sail ship,
civilian river boat and foot travel

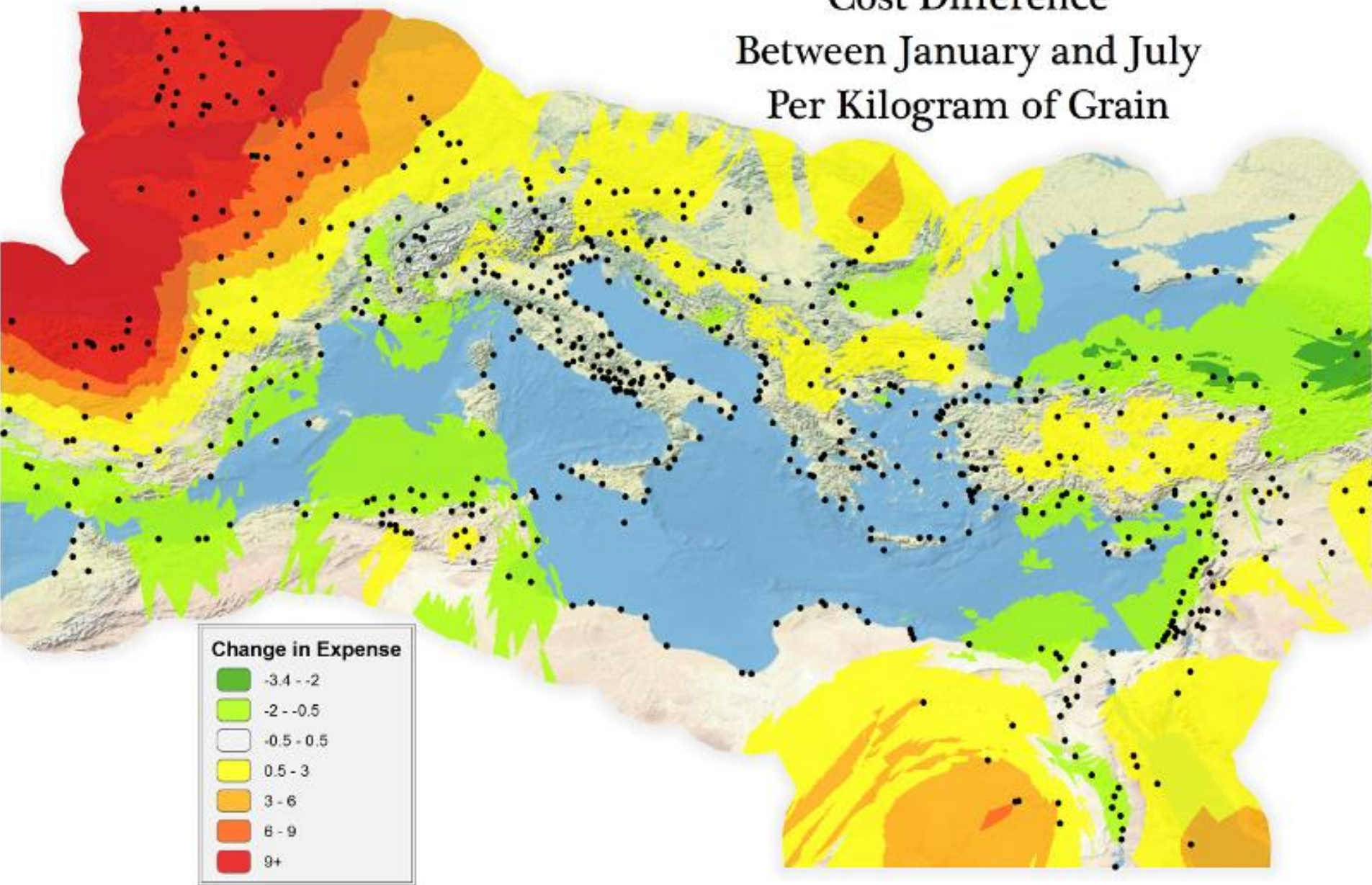
Contours indicate time in days

Source: <http://orbis.stanford.edu/>

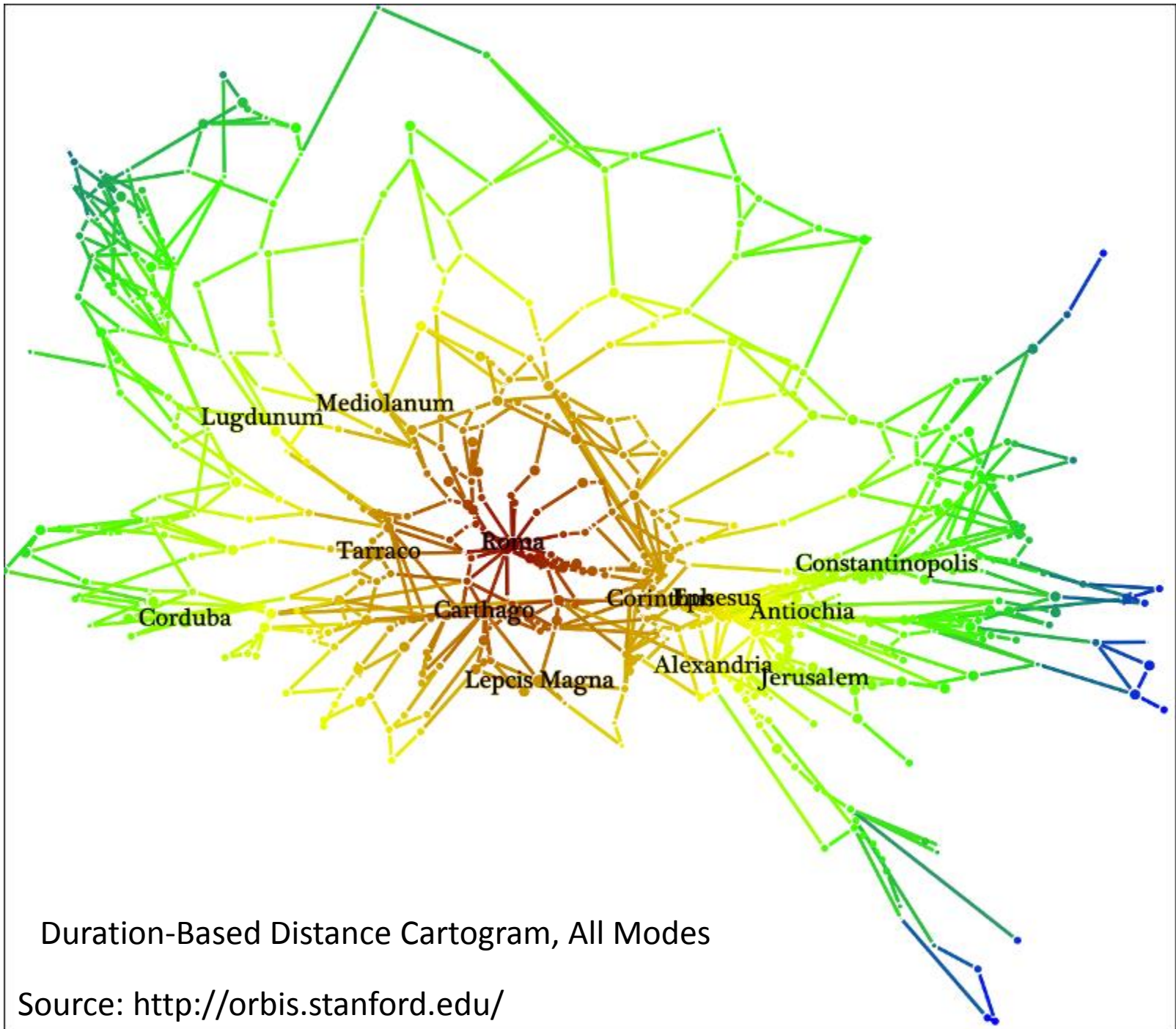


Source: <http://orbis.stanford.edu/>

Cost Difference Between January and July Per Kilogram of Grain



Source: <http://orbis.stanford.edu/>



Conclusions

Logistics played a vital role in the creation and maintenance of the Roman Empire.

This same attention to the importance of logistics should be paid in our modern times: **Roman military success often depended more on bread than iron.**

Thank you for your attention!

Main sources:

Jonathan P. Roth, The Logistics of the Roman Army at War www.brill.com/logistics-roman-army-war-264-bc-ad235

ORBIS: the Stanford Geospatial Network Model of the Roman World <http://orbis.stanford.edu>