

The rise and fall of the donkey: the Central Mediterranean islands

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This paper overviews the role of the donkey in the social and economic development of Sicily and the smaller central Mediterranean islands from medieval to early modern times. It attempts a reconstruction of the roles played by these much maligned yet indispensable animals in the production and transportation of people and products in these premodern communities. It is suggested that the role of the donkey and the mule in production and transportation expanded in relation to the regional development of these island communities. This claim is briefly tested with regard to the later medieval and early modern period. The destiny of these animals fluctuated across history in relation to a wide range of factors – like that of their human master, who domesticated them, engineered their physical development through creative crossbreeding, and channeled their labour towards a variety of technological applications. Building on centuries of exploitation of the donkey in various contexts, the animal's fortunes in later medieval to early modern Sicily and the other islands were inextricably linked to the development of the regional economy which took place as a result of later medieval regional integration and specialization.

Conquered from Islam in the course of the eleventh century, Sicily and the other central Mediterranean islands were at the crossroads of the Mediterranean world, the focus of intense maritime traffic along a network of major and minor sealanes which linked together the societies around its shores. By contrast with the substantial evolution of maritime transport, from the major bulk carriers to the small brigs running port to port cabotage, in response to growing needs between the eleventh and sixteenth centuries, the rugged terrain of the Sicilian interior lacked a proper road network until modern times, and forms of landbased travel and transportation in nineteenth and early twentieth century Sicily had progressed little since medieval times. The problem was not made any easier by the mountainous geography of much of the island, and the limited availability of river transport. Muleteers operating pack animal transport were closely regulated by the authorities, and their services were expensive. It was normally far easier, quicker and cheaper to travel and transport goods around Sicily on boats than across it via a land route.ⁱ The important economic roles of the boatman and the muleteer or *burdinaru* have been compared and underlined.ⁱⁱ Indeed, in modern Maltese, this word has been extended to port stevedores and haulage contractors.

Across Sicilian waters, on the smaller islands of Pantelleria, Malta, and Gozo, donkeys were indispensable partners to the islanders, and their export brought royal administrators a handsome profit. In the late tenth century Ibn Hauqal described the hunting of wild donkeys on Malta – the animals, he remarked, could be easily exported, trained and sold profitably.ⁱⁱⁱ Al-Idrīsī, the sharif who enjoyed the privilege of riding a donkey at the court of his monarch, lists among the central Mediterranean islands *djazīrat umm al-khimār* (mother of donkeys, or the island of Asinara north west of Sardinia)^{iv} or possibly *djazīrat umm al-khammār* (mother of the donkey-driver, or the Aeolian island of Panarea)^v Both Sardinia and Sicily claim their own distinct race of donkeys – and both races are strongly linked to native varieties originating on smaller offshore islands. Modern genetic studies have traced the

Sicilian varieties – the *ragusano* and the *grigio siciliano* – to the ancient variety of the donkeys of Pantelleria, which was diffused via western Sicily throughout the island because of its qualities. The *pantesco* is distinct for its height (reaching fifty-five inches) and its *ambio*, or gait. The numerous donkey shelters or *sarduni* across the island testify to a transportation network which continued to function until a few decades ago.

The geographical isolation of these smaller central Mediterranean islands transformed them into natural donkey sanctuaries permitting varieties to develop individual characteristics and survive into modern times. The white donkeys of Asinara have long had scientists debating the origin of their albinism. Malta too had its own race of donkeys, which were widely used on the island and exported to Sicily in early modern times.^{vi} Donkey remains were attested on the Maltese island of Gozo in a natural cave from around 3500 BC.^{vii} Only twelve specimens of the Maltese donkey were said to survive in 2001.^{viii} Similarly work has been undertaken to preserve for instance the Majorcan race of donkeys.^{ix}

The agrarian history of the island – a Mediterranean breadbasket since antiquity – was dominated by the extensive, large-scale cultivation of cereals, especially wheat. Whether worked by the plantation slaves of antiquity, medieval *villani* or early modern landless labourers, the island's vast *latifundia* produced this chief commodity which was harvested and carried by trains of pack mules and donkeys to depots where it was eagerly purchased by the agents of hungry Mediterranean cities, including Sicily's own populous urban centres. In the fifteenth century the Argonese Crown encouraged the development of a regional market economy by granting toll franchises and customs exemptions, as well as by establishing trade fairs to different communities across the whole royal *demanio*.^x Increased economic activity between production centres in different localities boosted transportation demands. Infrastructural investments such as road and bridge building were however limited. The rising demand with regard to land transport had to be mainly met with pack mule transport. Within this context of regional integration and specialization, it became easier to export animals from the smaller islands to Sicilian markets.

Sicily's soils were normally ploughed by teams of oxen, and the ox, which thrived on rough pasture, was normally cheaper than the horse – according to one source, horses cost double the price of oxen in the fifteenth and sixteenth centuries.^{xi} The ox has been unfairly blamed for Sicilian underdevelopment: Cancila cites the continued use of oxen as draught animals, because of the scarcity of fodder, rather than horses, “one of the fundamental factors which blocked Sicilian and southern Italian agricultural development.”^{xii} It would be equally unfair to load the island's woes on the donkey's back. Donkeys and mules featured prominently in intensive crop production – the cultivation of a wide variety of crops – especially as a result of the introduction of irrigation techniques and specialized skills during the Muslim domination. The transportation of all kinds of produce – including edible crops such as fruit and vegetables, as well as industrial crops like cotton – rested heavily on mule transport. The expansion of sugar production in later medieval Sicily depended heavily on donkey power to crush the cane, the first phase of the sugar making process.^{xiii} Likewise miners depended heavily on mule transport to extract and transport Sicilian salt, iron, alum, saltpetre, sulphur and other minerals.^{xiv}

The donkey was indispensable for transporting the bulky produce of *massarie* as well as their cultivators, and the baronial *mandre* outside Palermo and the other major cities could not function without its labours. Morevoer, donkey manure was highly sought

by orchard keepers. “No garden could exist without a donkey”, observed Goethe whilst travelling in Italy in 1786-88.^{xv} Access to mules or donkeys was very important for *braccianti* – “with such an animal, the cultivator gained both manure and the means to carry it to the fields” facilitating the cultivation of beans and other legumes which enrich the soil with nitrogen and provide inexpensive staple food.^{xvi} The donkey also bridged the gender divide: there are numerous references to donkey and mule riding ladies from all walks of life, empowering them in their role as active economic contributors.

According to Geoffrey Malaterra, the Norman conquerors of Sicily levied horses and mules, together with slaves and weapons, from subject Muslim populations, including Malta. Donkeys featured side by side with slaves in twelfth century bequests to religious establishments. Animal husbandry was a mainstay of the agricultural economy, and livestock featured prominently as a source of upper social class wealth. Mules and donkeys were also complementary to the horse in military establishments; for if the horse dominated the battlefield, castle complexes depended heavily on donkey power. For instance, Frederick II’s administrator in Malta, Giliberto Abate, reported around 1240 that the *castrum maris* of Malta had three *centimuli* or mills operated by five mules. There were also four asses and a couple of mules who worked in the castle bakery, together with two horse stallions and two donkey stallions. These animals consumed monthly thirteen *salme* of barley, almost 36 hectolitres at 2.75hl per *salma*. The other castle of Malta had two donkeys and one mule *in centimulo* consuming one *salma* of barley every month. One *centimulo* in the castle on the island of Gozo was operated by three asses a donkey stallion and a horse (*roncinus*). Furthermore, there were four toll mills (*centimulis quatuor de cabella*) operated by six mules. These received monthly rations totalling thirteen *salme* of barley. On the other hand, thirty two pack asses which transported produce from the royal estates on that island only got seven *salme* of barley. These details underline an important fact: that even in military establishments, the donkey and the mule played a very important role which could not be fulfilled by the horse.

The kingdom’s feudal elite and citizen corporations were obliged to maintain horses, including war steeds, in sufficient numbers to defend the island. The trade in horses was very closely controlled by the state. The stud farms maintained by Frederick II and his Hohenstaufen successors were restocked by Charles of Anjou to provide horses and mules for his army. The stud farm on the island of Corfu was “particularly productive”.^{xvii} Shortly after the Vespers, Messina was building large boats to transport horses, mules and other animals from Calabria, but imports apparently ceased after 1300.^{xviii} The Aragonese Crown worried about depletion of Sicilian stocks.^{xix} King Alfonso’s wars created a huge demand for horses and mules: annual exports to Spain and Naples soared from around 300 in the early 1420s to 500 in 1434-42.

Apart from the royal breeding farms, the feudal magnates were known to keep horse breeding ranches: Sicilian horses were exported by the barons as far away as England.^{xx} Moreover, the demanial cities designated reserves for horse pasture. In times of military crisis, such as the 1460s, the state intervened with legislation to compel the nobility and citizenry to keep horses.^{xxi} Citizen corporations were obliged to keep lists of notables who were expected to keep horses for the defence of their community.^{xxii} According to Epstein, from the late 1460s concerns about stock depletion blamed excessive numbers of mules rather than the export trade. First, in 1469-1471 the state compelled mule riders to keep the same number of horses.^{xxiii} Subsequently, in 1478-84. it imposed compulsory reproductive quota (e.g. royal

permission was needed to use up to a fourth of one's mares to breed mules^{xxiv}). In response to the Ottoman threat, in 1485 the state prohibited riding mules, and the main three cities were forbidden from exporting horses. These measures were generally repealed by 1490.

The Sicilian state's short sighted stance with regards to mules and donkeys was soon reversed. Pack animals were indispensable to premodern armies (and in many cases to modern troops as well): studying this point in a different context, but providing estimates which undoubtedly may be applied to many pre-modern situations, John Haldon suggests an approximate ratio of pack-mules to soldiers of 1:50. Nevertheless, he notes that one pack animal for a group of 16 soldiers was indicated as the norm, carrying their provisions for up to ten days, suggesting a ration of about six kilos per man and a total maximum load of around 96 kilos; soldiers would have to forage to supplement their meagre rations.^{xxv} According to a tenth century source cited by Haldon, one attendant was required per ten mules, but higher ratios (1400 mules driven by 280 attendants) have also been suggested for Roman armies^{xxvi}.

It is said of the Sicilian peasant that «he loves his donkey as he loves his wife».^{xxvii} The conflictual relationship between horse and donkey envisioned by the belligerent regime of 15th-century Sicily is not mirrored in everyday life, where their relationship is complementary. The multipurpose donkey enjoyed a comparative advantage over the horse – cheaper to acquire and keep, it fitted perfectly in the productive lifecycle of the peasant household economy. I have not come across documents indicating donkeys as a source of food, but there is modern anecdotal evidence of Maltese consumption of donkey milk into the twentieth century.^{xxviii} Consumption of donkey meat until modern times is well attested in southern France and Spain, for instance the sausage meat of Arles which was a mixture of donkey meat and Camargue bull beef.^{xxix} Moreover, donkey dung was used as fuel by different craftsmen for instance in pottery making for firing, and as pottery temper.^{xxx} It was also used in a range of other industrial activities, including the production of saltpetre. Strangely enough, in the compilation on agriculture referred to as the *Geoponika* donkey manure was the next most highly regarded after bird droppings.^{xxxi}

Given the importance of donkeys in transportation and agricultural production, the commercial potential of donkeys was unlikely to be overlooked. Ibn Hauqal might have foreshadowed the thriving trade in Maltese donkeys and mules in the Val di Noto and elsewhere which developed in late medieval and early modern times. Like the Pantescan race, the Maltese breed was renowned for its hardy qualities. Needless to say, horses in Malta were a luxury and all strata of the population depended heavily on donkeys for transportation of people and produce. The authorities could compel muleteers to serve with their beasts as part of their *angara* service (or corvee labour). The town council paid Jewish water carriers who transported water on their donkeys.^{xxxii}

According to the historiographer of the Order of St John, bearded nobles bearing daggers and riding on donkeys greeted the Knights of St John in Malta in 1530. Until 1492 Maltese Jews were closely involved in the donkey transport business.^{xxxiii} Maltese references to the *cuffa*, the *bertuli* and the *zimbili* reveal an insight into the popular culture of Jewish traders who travelled from Mdina to outlying villages with their wares. The business was closely supervised by the Christian authorities. In 1518 the town council ordered landowners at the maritime suburb of Birgu not to block the quay, but to leave enough passageway so that two loaded pack animals moving in opposite directions could pass side by side.^{xxxiv}

The island also profited from the export of animals. In 1512, the Maltese *secrezia* recorded an income from export tariffs on animals, including mules, of 18 uncie 18 *tareni*^{xxxv} This was two and a half times the govt income from cotton exports, the island's main product, recorded in the *ius cuctonis*. Export registers kept by administrators of the Hospitaller government in Malta recorded painstakingly the export of Maltese donkeys to Sicily: over the two decades between 1589 and 1611, 732 donkeys and 199 mules were ferried by Maltese merchants to Sicilian ports.^{xxxvi} Maltese donkeys were available cheaply and in good numbers: by the early 18th century their price fell to four *tareni* or one third of a scudo per animal.^{xxxvii} This was nothing like the prices reported in Sicily to Gladstone in the 1830s: "A mule fetches twice as much as a horse of the same size and age: or even in a greater proportion: and their prices mount up to 80 and 100 ounces – forty and fifty pounds".^{xxxviii} The Maltese animals were normally unshoed. One seventeenth century visitor in Malta, Philip Skippon, noted how Maltese donkeys had slit noses in order to breathe better and run faster.^{xxxix} Sicilian town capitoli and other records show how the muleteers were kept under constant watch by town authorities including market officials, and not without good reason. Close links have been identified in premodern societies between muleteers, banditry and contraband; these enjoyed a near monopoly as mule-trains formed "the principal means of commercial transit".^{xl}

"It is rather sad to leave one's mule after a service of near four hundred miles, without being able to like him," wrote Gladstone in November 1838. "But the acquaintance which it gives with this race is to us one of the characteristic features of Sicilian travelling. They seem to have no sense of fatigue, of kindness, or of emulation: a light or a heavy load, a long or a short distance, a good or a bad road, provided only the pace be not rapid, are all alike without the slightest effect upon the physical composure of the mule. The wiry beast works in his own way and in no other, resenting punishment but hardly otherwise affected by it, and still less accessible by any other means of influence. Michael (Gladstone's mule-driver) calls his mules 'porco!' when they stumble. But they really seem like Frankensteins of the animal creation. Sympathy however they have: and with a faint yet wild and unnatural neighing they will sometimes recognize relationship."^{xli}

By eighteenth and nineteenth century standards, donkey travel might have been utterly uncomfortable for urbanite ladies used to journeys on horse drawn carriages; but it was efficient and cost effective. There are some eloquent testimonies in this regard. According to Gladstone, "the motion is most anomalous, and most disagreeable. For each pair of feet moved by the mule, the body of the rider receives a distinct backward and forward impulse: the strain on the stirrups is great: and the whole body is so incessantly shaken that even the back and shoulder blades partake in the resulting aches."^{xlii} The playwright Mariana Starke's description of the Sicilian *lettiga* carried by mules^{xliii} is intriguing: "No regular post-roads having yet been established, travellers are under the necessity of going from place to place throughout the island, either in a *lettiga*, or on mules. A *lettiga*, the national carriage, holds two persons; and is, in shape, something like the body of a *Vis-à-vis*. This Vehicle, provided with strong poles, resembling those of a sedan-chair, is carried by very powerful potter-mules, as the body of a travelling carriage was, in past times, conveyed over the *Mont-Cenis*. Two mules go before, and one behind, accompanied by a muleteer on foot, armed with a stick, ten or twelve feet long, to guide the mules; and another muleteer mounted, and riding at the head of the *Cavalcade*." Besides lamenting the lack of cushions, Starke remarked, "the motion of a *Lettiga* is fatiguing, and apt to produce drowsiness: and, moreover, the country cannot be seen to advantage in these Vehicles: neither can

Travellers, thus conveyed, stop when they wish it; as the mule-bells prevent the muleteers from hearing, when called to.”

The extension of technological innovations to outlying communities gradually marginalized the donkey’s economic role and functions. But not completely. Donkey driven grain mills were common in many households on Pantelleria until the early twentieth century. The olive-oil producers on Djerba still utilized donkey-driven millstones to crush the olives well into the twentieth century, but between 1938 and 1968 these decreased from 284 to some 50 in all.^{xliv} Modern donkey-powered norias may still be seen on Majorca, as described by Royle.^{xlv} “This was a donkey powered, low-tech arrangement where the donkey would spend its life walking in a circle attached to a beam which would turn a post horizontally. On the post were a series of cogs that, through basic gearing, would drive a vertical wheel that dipped down into the water. Attached to the wheel were terracotta pots, which would bring up water, which, after reaching the top of the wheel’s rotation, would spill their contents into a trough.”

The diffusion of the windmill and the watermill across the larger and smaller Mediterranean islands has been, at best, remarkably uneven. As Horden and Purcell point out, “an account of the technology itself is literally meaningless to the historian unless animated by social history.”^{xlvi} Different forms of transport and production technologies could also coexist for considerable periods of time side by side. Until the introduction of the vertical water wheel, water-powered technology was not substantially better than animal-powered mills: “for most of the era of water power, the typical horizontal watermill was capable of generating little more power than a donkey or horse, and often not that much. It could be used only for a single task (milling grain), and it was wasteful of water.”^{xlvii} According to one version, “an early primitive mill of the ‘undershot’ design (in which the water passed under the mill’s blades or buckets) could grind four hundred pounds of corn per hour – the equivalent of three horsepower, versus ten pounds per hour for a ‘donkey mill’ that was manned by two labourers.”^{xlviii}

The more advanced Vitruvian mill, with a vertical wheel and horizontal shaft, could grind about forty times the quantity of grain processed by a donkey mill each day.^{xlix} Harvey notes that even on the larger Byzantine estates, animal driven mills could still be found as late as the thirteenth century. Rather than a sign of “technological regression”, “the coexistence of animal- and water-mills was a sensible precaution”. Water mills were vulnerable to climatic extremes, as streams could freeze in wintertime or dry up completely in summer; moreover, in times of war the water supply to the mill could easily be blocked.¹

Almost charged with being an instrument of underdevelopment, the poor mule plods through history encumbered with the weight of the past. Near total dependence on mules and donkeys up to 1900, and in certain areas well beyond that date, might be taken for granted as a sure sign of the *mezzogiorno*’s backwardness. “The island is incredibly poor and incredibly backward,” wrote D H Lawrence whilst visiting Sicily. “There are practically no roads for wheeled vehicles, and consequently, no wheeled vehicles, neither carts nor carriages, outside the towns. Everything is packed on asses or mules, man travels on horseback or on foot, or, if sick, in a mule litter. The land is held by the great landowners, the peasants are almost serfs. It is as wild, as poor, and in the ducal houses of Palermo, even as splendid and ostentatious as Russia.”¹¹ It is hoped that the foregoing points might lead historians to review the purported relationship between the region’s transport and production infrastructure, and the animals around

which it operated. A comprehensive study of the vital role played by the donkey and the mule would have to compare their “rise and fall” with that of the horse and the ox across a varied regional spectrum. The results from such an exercise would be profitably integrated with recent efforts to redimension the *mezzogiorno*’s social and economic history, especially with regard to the debate on regional development in the later medieval and early modern period. By refocusing the historian’s attention on this unassuming protagonist of the pre-modern economy, an interesting alternative would be opened up to anthropocentric perspective of history. In the dock of history, it might be shown that the donkey and the mule should not be blamed for man’s failures unless they are also allowed to partake in his achievements.^{lii}

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NOTES

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1. Peter Spufford, *Power and Profit* (Thames and Hudson, 2002), 201-2; S R Epstein, *An Island for Itself* (Cambridge University Press, 1992), 81-2
2. Henri Bresc, *Un monde méditerranéen. Économie et société en Sicile, 1300-1450* Rome 1986, I, 362-4
3. A T Luttrell, ‘Ibn Hauqal and Tenth Century Malta’, *Hyphen* V, 4 (Malta, 1987), 157-160. The debate on whether the author mixed up Malta with Galita is inconclusive. See J M Brincat, *Malta 870-1054. Al-Himyāri’s account and its linguistic implications* (Malta, 1995)
4. Michele Amari, *Biblioteca Arabo-Sicula*, I, 44
5. Henri Bresc and Annliese Nef (eds), *Idrīsī. La première géographie de l’Occident* (Flammarion, 1999), 301
6. Carmel Cassar, ‘U mulu di Malta’, *Storja* (Malta, 1996)
7. David H Trump, *Malta Prehistory and Temples*, (Malta, 2002) 209 tooth of a donkey in the Ggantija phase deposit in the Pergla Cave, Xaghra
8. *Malta Today*, Interview with Prof Mark Brincat on genetic back-breeding programme, 2 February 2001
9. See <http://www.agraria.org/zootecnia/mulo.htm> On the Majorcan race see <http://www.racesautoctones.com/>
10. Bresc, *Un monde*; Epstein, *An Island for Itself*.
11. O Cancila, *Baroni e popolo nella Sicilia del grano* (Palermo, 1983), 97-8
12. Cancila, *Baroni e Popolo*, 98-9
13. C Trasselli, *Storia dello Zucchero Siciliano* (Caltanissetta – Roma, 1982)
14. Epstein, 222-237
15. Goethe, *Italian Journey* (Penguin, 1962), 319 describing the transportation of refuse from Naples’s vegetable gardens: ‘A boy or a farm hand, sometimes even the farmer himself, hurry as often as possible during the day into the city, which for them is a real gold mine. You can imagine how intent these collectors are on the droppings of mules and horses.’

16. Peter Schneider and Jane Schneider, 'High fertility and poverty in Sicily: beyond the culture vs rationality debate', in Susan Greenhalgh (ed), *Situating Fertility: Anthropology and Demographic Inquiry* (Cambridge University Press, 1995), 179-201, at 187.
17. Jean Dunbabin, *Charles I of Anjou* (Longman, 1998), 173
18. Epstein, 261
19. Exports prohibited in 1397: Epstein, 261
20. C Trasselli, *Da Ferdinando il Cattolico a Carlo V* (Soveria Mannelli, 1982), I, 360-1 and note 9 on Federico Abbatelli Count of Cammarata who was a major horse breeder
21. S R Epstein, *An Island for Itself*, (Cambridge University Press, 1992), 263. Epstein debates the conclusions reached by H Bresc, *Un monde méditerranéen: économie et société en Sicile, 1300-1450* (2 volumes, Rome, 1986)
22. See for instance Malta National Library ms Universitas 12, list of citizens in Mdina keeping horses
23. Epstein, 263
24. Epstein, 263 note 235
25. John Haldon, *Warfare, State and Society in the Byzantine World, 565-1204* (Routledge, 1999), Appendix 3, 287-292; 168-170 for estimates of provisions required by horses and mules
26. Jonathan Roth, *The Logistics of the Roman Army at War (264 B.C. – A.D.235)* (Brill, 1999), 113-4
27. Lorenzoni 1910 cited after Schneider & Schneider
28. On the benefits of donkey milk see B Chiofalo, 'Gli acidi grassi nel latte di asina', consulted online at <http://www.atnesa.org/donkeydocuments/Chiofalo-2001-donkeymilk-IT.pdf>
29. Maguelonne Toussaint-Samat, *History of Food*, (Blackwell, 1994), 98-9, 421
30. Clive Orton et al, *Pottery in Archaeology*, (Cambridge University Press, 1993), 71, 130
31. Alan Harvey, *Economic Expansion in the Byzantine Empire, 900-1200*, (CUP, 2003), 127
32. Godfrey Wettinger, *The Jews of Malta in the later Middle Ages* (Malta, 1985), 23-4
33. Wettinger, 45
34. National Library of Malta, Valletta, MS Università 12, 4 Sept 1518, fol 192
35. Introitus animalium extractorum a dicta insula: E Mazzaresse Fardella (ed) J Luca de Barberiis, *Liber de Secretiis* (Milano, 1966), 74
36. Carmel Cassar, 'U mulu di Malta', *Storja* (Malta, 1996)
37. Cassar, 455; around 1600 skilled labourers were paid this amount for a day's labour: C Cassar, *Society Culture and Identity in Early Modern Malta* (Malta, 2000), 54
38. Gladstone, 444; see also 459: 'an average working mule costs 30 oncie (15 pounds), horse eight pounds, ox five pounds, sheep fifteen carlini (5/1), lamb three carlini'
39. Carmel Cassar, 'Popular Perceptions and Values in Hospitaller Malta', in Victor Mallia Milanese (ed), *Hospitaller Malta 1530-1798* (Malta, 1993), 455
40. Brian R Hamnett, *Roots of Insurgency*, (Cambridge University Press, 2002), 64-5
41. W E Gladstone, *The Gladstone Diaries* (Oxford University Press, 1969), 481.
42. Gladstone, 456-7; but later on he reported getting used to this kind of riding, 477
43. M. Pfister (ed), *Fatal Gift of Beauty: Italies of British Travellers* (Rodopi, 1996), 127
44. S Tlatli, *Djerba, l'Île des Lotophages* (Tunis, 1969)
45. Stephen Royle, *A Geography of Islands: Small Island Insularity*, (Routledge, 2001), 63
46. P Horden and N Purcell, *The Corrupting Sea* (Blackwell, 2000), 256

47. Terry S Reynolds, *Stronger than a Hundred Men. A History of the Vertical Water Wheel* (Johns Hopkins University Press, 2003), 7; M M Postan (ed), *Cambridge Economic History of Europe Vol I The Agrarian Life of the Middle Ages*, (Cambridge UP, 1966), 147; Lynn White, *Medieval Technology and Social Change*, (OUP, 1966), 108, 161 on the mule-mill. See also Cato, *On Agriculture*, for detailed inventory of men, beasts and tools need in the cultivation of olive orchards and vineyards: John W Humphrey, *Greek and Roman Technology: A Sourcebook* (Routledge, 1998), 84-5
48. William I Bernstein, *The Birth of Plenty* (McGraw-Hill, 2004), 165
49. Harvey, *Economic Expansion*, 129
50. Harvey, *Economic Expansion*, 132
51. D H Lawrence, *Introductions and Reviews* (Cambridge University Press, 2005), 377
52. Sadly this was not always a metaphor; see the classic study by E.P.Evans, *The Criminal Prosecution and Capital Punishment of Animals* (London, Faber, 1906)

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I am grateful to Ed Emery, Paul Starkey, and all the participants at the Hydra Donkey Conference for their positive response to this paper.

ⁱ Peter Spufford, *Power and Profit* (Thames and Hudson, 2002), 201-2; S R Epstein, *An Island for Itself* (Cambridge University Press, 1992), 81-2

ⁱⁱ Henri Bresc, *Un monde méditerranéen. Économie et société en Sicile, 1300-1450* Rome 1986, I, 362-4

ⁱⁱⁱ A T Luttrell, ‘Ibn Hauqal and Tenth Century Malta’, *Hyphen V*, 4 (Malta, 1987), 157-160. The debate on whether the author mixed up Malta with Galita is inconclusive. See J M Brincat, *Malta 870-1054. Al-Himyāri’s account and its linguistic implications* (Malta, 1995)

^{iv} Michele Amari, *Biblioteca Arabo-Sicula*, I, 44

^v Henri Bresc and Anliese Nef (eds), *Idrīsī. La première géographie de l’Occident* (Flammarion, 1999), 301

^{vi} Carmel Cassar, ‘U mulu di Malta’, *Storja* (Malta, 1996)

^{vii} David H Trump, *Malta Prehistory and Temples*, (Malta, 2002) 209 tooth of a donkey in the Ggantija phase deposit in the Pergla Cave, Xaghra

^{viii} *Malta Today*, Interview with Prof Mark Brincat on genetic back-breeding programme, 2 February 2001

^{ix} See <http://www.agraria.org/zootecnia/mulo.htm> On the Majorcan race see <http://www.racesautoctones.com/>

^x Bresc, *Un monde*; Epstein, *An Island for Itself*.

^{xi} O Cancila, *Baroni e popolo nella Sicilia del grano* (Palermo, 1983), 97-8

^{xii} Cancila, *Baroni e Popolo*, 98-9

^{xiii} C Trasselli, *Storia dello Zucchero Siciliano* (Caltanissetta – Roma, 1982)

^{xiv} Epstein, 222-237

^{xv} Goethe, *Italian Journey* (Penguin, 1962), 319 describing the transportation of refuse from Naples’s vegetable gardens: ‘A boy or a farm hand, sometimes even

the farmer himself, hurry as often as possible during the day into the city, which for them is a real gold mine. You can imagine how intent these collectors are on the droppings of mules and horses.’

^{xvi} Peter Schneider and Jane Schneider, ‘High fertility and poverty in Sicily: beyond the culture vs rationality debate’, in Susan Greenhalgh (ed), *Situating Fertility: Anthropology and Demographic Inquiry* (Cambridge University Press, 1995), 179-201, at 187.

^{xvii} Jean Dunbabin, *Charles I of Anjou* (Longman, 1998), 173

^{xviii} Epstein, 261

^{xix} Exports prohibited in 1397: Epstein, 261

^{xx} C Trasselli, *Da Ferdinando il Cattolico a Carlo V* (Soveria Mannelli, 1982), I, 360-1 and note 9 on Federico Abbatelli Count of Cammarata who was a major horse breeder

^{xxi} S R Epstein, *An Island for Itself*, (Cambridge University Press, 1992), 263. Epstein debates the conclusions reached by H Bresc, *Un monde méditerranéen: économie et société en Sicile, 1300-1450* (2 volumes, Rome, 1986)

^{xxii} See for instance Malta National Library ms Universitas 12, list of citizens in Mdina keeping horses

^{xxiii} Epstein, 263

^{xxiv} Epstein, 263 note 235

^{xxv} John Haldon, *Warfare, State and Society in the Byzantine World, 565-1204* (Routledge, 1999), Appendix 3, 287-292; 168-170 for estimates of provisions required by horses and mules

^{xxvi} Jonathan Roth, *The Logistics of the Roman Army at War (264 B.C. – A.D.235)* (Brill, 1999), 113-4

^{xxvii} Lorenzoni 1910 cited after Schneider & Schneider

^{xxviii} On the benefits of donkey milk see B Chiofalo, ‘Gli acidi grassi nel latte di asina’, consulted online at

<http://www.atnesa.org/donkeydocuments/Chiofalo-2001-donkeymilk-IT.pdf>

^{xxix} Maguelonne Toussaint-Samat, *History of Food*, (Blackwell, 1994), 98-9, 421

^{xxx} Clive Orton et al, *Pottery in Archaeology*, (Cambridge University Press, 1993), 71, 130

^{xxxi} Alan Harvey, *Economic Expansion in the Byzantine Empire, 900-1200*, (CUP, 2003), 127

^{xxxii} Godfrey Wettinger, *The Jews of Malta in the later Middle Ages* (Malta, 1985), 23-4

^{xxxiii} Wettinger, 45

^{xxxiv} National Library of Malta, Valletta, MS Università 12, 4 Sept 1518, fol 192

^{xxxv} Introitus animalium extractorum a dicta insula: E Mazzaresse Fardella (ed) J Luca de Barberiis, *Liber de Secretiis* (Milano, 1966), 74

^{xxxvi} Carmel Cassar, ‘U mulu di Malta’, *Storja* (Malta, 1996)

^{xxxvii} Cassar, 455; around 1600 skilled labourers were paid this amount for a day’s labour: C Cassar, *Society Culture and Identity in Early Modern Malta* (Malta, 2000), 54

- ^{xxxviii} Gladstone, 444; see also 459: ‘an average working mule costs 30 oncie (15 pounds), horse eight pounds, ox five pounds, sheep fifteen carlini (5/1), lamb three carlini’
- ^{xxxix} Carmel Cassar, ‘Popular Perceptions and Values in Hospitaller Malta’, in Victor Mallia Milanés (ed), *Hospitaller Malta 1530-1798* (Malta, 1993), 455
- ^{xl} Brian R Hamnett, *Roots of Insurgency*, (Cambridge University Press, 2002), 64-5
- ^{xli} W E Gladstone, *The Gladstone Diaries* (Oxford University Press, 1969), 481.
- ^{xlii} Gladstone, 456-7; but later on he reported getting used to this kind of riding, 477
- ^{xliii} M. Pfister (ed), *Fatal Gift of Beauty: Italies of British Travellers* (Rodopi, 1996), 127
- ^{xliv} S Tlatli, *Djerba, l’Île des Lotophages* (Tunis, 1969)
- ^{xlv} Stephen Royle, *A Geography of Islands: Small Island Insularity*, (Routledge, 2001), 63
- ^{xlvi} P Horden and N Purcell, *The Corrupting Sea* (Blackwell, 2000), 256
- ^{xlvii} Terry S Reynolds, *Stronger than a Hundred Men. A History of the Vertical Water Wheel* (Johns Hopkins University Press, 2003), 7; M M Postan (ed), *Cambridge Economic History of Europe Vol I The Agrarian Life of the Middle Ages*, (Cambridge UP, 1966), 147; Lynn White, *Medieval Technology and Social Change*, (OUP, 1966), 108, 161 on the mule-mill. See also Cato, On Agriculture, for detailed inventory of men, beasts and tools need in the cultivation of olive orchards and vineyards: John W Humphrey, *Greek and Roman Technology: A Sourcebook* (Routledge, 1998), 84-5
- ^{xlviii} William I Bernstein, *The Birth of Plenty* (McGraw-Hill, 2004), 165
- ^{xlix} Harvey, *Economic Expansion*, 129
- ^l Harvey, *Economic Expansion*, 132
- ^{li} D H Lawrence, *Introductions and Reviews* (Cambridge University Press, 2005), 377
- ^{lii} Sadly this was not always a metaphor; see the classic study by E.P.Evans, *The Criminal Prosecution and Capital Punishment of Animals* (London, Faber, 1906)