HANNIBAL'S MULES: THE LOGISTICAL LIMITATIONS OF HANNIBAL'S ARMY AND THE BATTLE OF CANNAE, 216 B.C.

Few historical figures have captured the imaginations of so many historians and writers as Hannibal. To many he is a heroic and romantic figure. For over fifteen years in Italy Hannibal fought off the massive resources of the Roman Confederacy alone, and with little support from his homeland. Struggling against great odds, surviving only by his wits, Hannibal, nevertheless, was destined to be overcome by the overwhelming forces arrayed against him. Military historians traditionally place him alongside such leaders as Napoleon or Robert E. Lee as another example of a great general who won all the battles yet lost the war. Indeed, throughout his many years of campaigning in Italy, Hannibal inflicted one crushing defeat after another on Roman forces, only to have final victory elude him. Historians from Livy on agree that Hannibal's best opportunity for a decisive victory was immediately following the battle of Cannae in 216 B.C., where he destroyed Rome's largest field army. If Hannibal had taken advantage of his victory by marching on Rome, they argue, the Romans would have been forced to sue for peace. For one reason or another, however, Hannibal chose not to march against Rome at that time. Livy claims that this decision was the salvation of the Roman state.[1] Hannibal missed his one chance for a decisive conclusion to the war. Despite another 13 years of campaigning in Italy, Hannibal would never recover this lost opportunity. The Second Punic War became a long, protracted struggle of attrition which ultimately favored Rome and resulted in Carthage's decisive defeat. Thus, Hannibal's failure to march on Rome was a fatal error and a stain on his military reputation. This argument became the conventional wisdom on Hannibal's generalship.

Livy himself may very well have been the originator of this tradition. Livy was writing Roman history on an epic scale and to him Hannibal presented both an appropriate heroic and tragic figure. Hannibal was the single greatest threat faced by Rome in her long history. Hannibal's military and diplomatic abilities made him seem larger than life and, thus, a worthy opponent of the Roman

1 Livy 22.51.4. This view was also held by Cassius Dio (Zonaras, 9.1, 9.14), Diodorus Siculus (25.19.1), Florus (1.22.19-21), Orosius (4.16.1) and the unknown author of the *De Viris Illustribus* (42). See also T. Arnold, *The History of Rome* II (New York 1846) 316.

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state. Rome's ultimate triumph over such a great leader as Hannibal would further show the inherent moral superiority and destiny of the Roman state. Hannibal's role in this grand scheme would be a tragic one, a great man whose great enterprise was doomed to failure. Hannibal's character emerged as a constant theme in Livy's history. Livy's intention was to heighten the dramatic and didactic power of his narrative. The literature of Greece and Rome is full of examples of great men who came to grief. All these tragic figures had one significant flaw which proved their ultimate undoing. One such failing was *hybris*, excessive pride, which led to tragic decisions. Thus Hannibal could be cast as a character similar to many tragic figures from Greek literature, such as Sophocles' Oedipus. Hannibal, like Oedipus, blindly makes a series of mistakes which bring about his own downfall because of his *hybris*.[2] Both Hannibal and Oedipus realize their errors only when it is too late; Oedipus at the end of *Oedipus Rex* and Hannibal as he is sailing away from Italy after being recalled to Carthage in 203 B.C.[3] Oedipus' error is his persistence in pursuing the truth despite repeated warnings. Hannibal's downfall is due to his failure to move on Rome after Cannae. To emphasize this point, Livy describes a scene after the battle in which Hannibal's chief cavalry commander, Maharbal, tries to persuade him that the best way to follow up his victory would be to promptly march on Rome. Hannibal, however, declined, believing this option to be too impractical. Livy claims Maharbal responded: "Assuredly no one man has been blessed with all God's gifts. You know, Hannibal, how to win a fight; you do not know how to use your victory."[4] Livy later reinforces this picture of Hannibal by describing him as absorbed by the ransom of his prisoners, being more preoccupied "...with the cares of a conqueror rather than those of a general with a war on his hands."[5] Hannibal had ultimate victory within his grasp but let it slip away from him because of his own carelessness and arrogance. Livy's later narrative of the war would show that despite all of Hannibal's efforts, he would fail to regain this lost opportunity. This is why Livy reminds us of the crucial decision made after Cannae when he describes Hannibal's departure from Italy. Thus, for Livy, Hannibal's failure is directly attributed to his fatal weakness of character, his *hybris*.[6] Hannibal's failure also proves the providen-

2 P.G. Walsh, *Livy: His Historical Aims and Methods* (Cambridge 1961) 103.

3 Livy 30.20.7-9. See also Zonaras 9.1, 9.6.

4 Livy 22.51.4. Plutarch (*Vit. Fab. Max.* 17.2) attributes this statement to Barca the Carthaginian.

5 Livy 22.58.1.

6 For a discussion of the character of Hannibal in ancient and modern historiography, see Karl Christ, "Zur Beurteilung Hannibals," *Historia* 17 (1968) 461-495; Arthur J. Pomeroy, "Hannibal at Nuceria," *Historia* 38 (1989) 162-176; D.W.T. Vessey, "The Dupe of Destiny: Hannibal in Silius, *Punica* III," *CJ* 77 (1982) 320-335; J. Kromayer, "Hannibal als Staatsmann," *HZ* 103 (1909) 237-273; Id., "Waren Hannibal und Friedrich der Große

tial nature of Rome's fate, a step towards fulfilling her destiny to triumph over Carthage and, eventually, the entire world.

The Reasons Why

Generations of writers since Livy have speculated on Hannibal's character. The portraits of Hannibal which they paint vary from sympathy to outright hostility. These portraits, however, tend to tell us more about the writers than the man they seek to describe. Hannibal had already become a mythic figure even before Livy had written his history. Every writer since antiquity found in Hannibal the kind of man they wanted him to be. None of these descriptions are very helpful in understanding Hannibal's actions or evaluating his decisions. We will never know the true human being who was Hannibal, but we can evaluate his abilities as a military leader on the basis of his actions, and speculate on his possible motives.

Historians since the last century have tended to view Hannibal less as a tragic figure and more as a pragmatic man who had to base his decisions on overriding, practical considerations. Nearly all historians of the Second Punic War have proposed their own reasons for Hannibal's refusal to march on Rome. The following quotation from Hallward helps to sum up the views of these writers since many of them have adopted either one or both of these assumptions in their own explanations of Hannibal's behavior. Hallward states that Hannibal refused to attack Rome after the battle because Hannibal recognized "...the futility of such an empty gesture before the walls of Rome, which would have lessened the moral effect of his victory and would have abandoned the opportunity of obtaining more important gains."[7] The two assumptions Hallward is making are: (1) that Hannibal was not capable of capturing Rome and (2) that the capture of Rome was not part of Hannibal's strategy. Hallward's first argument is not a satisfactory explanation of Hannibal's refusal to attack Rome since he does not give us any reasons why such a move would amount to an empty gesture. His second argument presumes some knowledge of Hannibal's intentions. Hallward's second assumption also indicates that he, along with many other historians, seems to have accepted without question Livy's statement of Hannibal's intentions. Livy conveys this within the context of a speech Hannibal makes to his Roman prisoners after the battle of Cannae in which Hannibal tells them that he was not engaged in a war to the death with

wirklich Ermüdungsstrategen?," *HZ* 131 (1925) 393-408; A.D. Fitton-Brown, "After Cannae," *Historia* 8 (1959) 365-371; H.V. Canter, "The Character of Hannibal," *CJ* 24 (1929) 564-577; Jérôme Carcopino, *Profils de Conquérants* (Paris 1961) 109-235.

7 B.L. Hallward, "Hannibal's Invasion of Italy," in *CAH* VIII (Cambridge 1930) 55.

Rome, but was fighting only for honor and empire.[8] Accordingly, commentators have since assumed that Hannibal was unwilling to deliver the *coup de grâce* by attempting to destroy Rome. Given the nature of our sources, it is safe to say that no one knows for certain what Hannibal's intentions truly were.[9] Nevertheless, many writers, such as Hallward, Delbrück, Picard, Bagnall, Caven, and others, have discerned a strategy for Hannibal based on their own interpretations of his actions.[10] None of these 'strategies' included the capture of Rome by Hannibal, even if the opportunity had arisen. Hannibal did not march on Rome, they reason, because it was not part of his strategy. Instead, Hannibal's strategy was to weaken the Roman Confederacy by detaching her allies and thereby forcing her to sue for peace. Hannibal, therefore, had to focus his energy on gaining control of the more 'important' cities. This argument is rather strange when considering the circumstances of the war. One wonders what other city in Italy could have been of such greater political importance to the Roman Confederacy that it could reduce the status of Rome to that of a secondary objective. Fuller argues that "... Had Rome capitulated or been stormed, all Spain, Sardinia and Sicily would have fallen with her into his (Hannibal's) lap ..."[11] The capture of Rome would not only have resulted in the detachment of her many allies, but it also would have resulted in the total destruction of the Roman Confederacy, as well as ending the war. It is ridiculous to suppose that Hannibal would not have seized the opportunity to bring the war to a swift, decisive conclusion. If Hannibal did not attack Rome, then it must have been for practical reasons, not on account of some putative strategic plan attributed to him by earlier historians.

8 Livy 22.58.2-3.

9 However Polybius (3.2.1-3.) reports that the Carthaginians had hoped to capture Rome.

10 B.L. Hallward, "The Roman Defensive," *CAH* VIII (Cambridge 1930) 61; H. Delbrück, *History of the Art of War* I (trans. by W. Renfroe, Westport, Conn. 1975) 338-339; G. Charles-Picard and C. Picard, *Carthage* (trans. by Dominique Colon, London 1987) 257; N. Bagnall, *The Punic Wars* (London 1990) 194-195; B. Caven, *The Punic Wars* (London 1980) 93-95, 141. See also L. Cottrell, *Hannibal* (New York 1961) 150; B.S. Strauss and J. Ober, *The Anatomy of Error* (New York 1990) 135-161; J. Briscoe, "The Second Punic War," *CAH* VIII (2nd ed. Cambridge 1989) 46; J.F. Lazenby, *Hannibal's War* (Warminster 1978) 86; A.D. Fitton-Brown, "After Cannae" (as in n. 6); Field-Marshal Viscount Montgomery of Alamein, *A History of Warfare* (Cleveland 1968) 91; J.P.V.D. Balsdon, *Rome: The Story of an Empire* (London 1970) 26; L. Homo, *Primitive Italy and the Beginnings of Roman Imperialism* (trans. by V. Gordon Childe, New York 1926) 289-291; W.W. How, *A History of Rome* (London 1910) 200; Tenney Frank, *A History of Rome* (New York 1923) 122; M. Cary, *A History of Rome* (2nd ed. New York 1967) 164-165; F.W. Walbank, *A Historical Commentary on Polybius* I (Oxford 1957) 42.

11 J.F.C. Fuller, *A Military History of the Western World* I (New York 1954) 129.

The Problems of Siege Warfare

Many historians have, accordingly, adopted the first assumption, namely, that Hannibal was not capable of capturing Rome. This argument was favored by some of the most eminent Roman historians. Mommsen regarded a move on Rome as a hollow demonstration and further stated that the systems for attacking fortresses in antiquity were far less developed than the systems for defense.[12] The impracticality of siege warfare would emerge as a constant theme among later generations of authors. Fuller states that not only did Hannibal not possess a siege train at that time but that he did not endeavor to build one at a later date.[13] Other writers, such as Dodge, De Sanctis, Morris, Lamb, and others, have also uncritically accepted the argument that Hannibal did not possess a siege-train, even though this fact is not explicitly stated by any ancient author.[14] All writers acknowledge the presence of siege weapons at Hannibal's assault on Saguntum in Spain,[15] but assume that he left them behind when he marched into Italy.[16] Scullard believed that Hannibal's siege capabilities were sufficient to allow him to attack smaller towns such as Casilinum and Petelia, but that larger cities such as Naples, Tarentum or even Rome were beyond his reach. Laurenzi, Homo and Carcopino also argued that the defenses of Rome were too strong for Hannibal to besiege successfully.[17] Warmington

12 T. Mommsen, *History of Rome* II (trans. by William P. Dickson, New York 1894) 168.

13 Fuller, *Military History* (as in n. 11) 129.

14 T.A. Dodge, *Great Captains* (1889; repr. Port Washington 1968) 58-59; Id., *Hannibal* (Cambridge 1893) 381; G. De Sanctis, *Storia dei Romani* III, 2 (2nd ed. Florence 1968) 203; W. Morris, *Hannibal* (New York 1897) 181; H. Lamb, *Hannibal* (London 1959) 105. See also E. Bradford, *Hannibal* (London 1981) 118; T. Dorey and D. Dudley, *Rome Against Carthage* (London 1971) 67-68; Strauss and Ober, *Anatomy* (as in n. 10) 149; D. Armstrong, *The Reluctant Warriors* (New York 1966) 41-42; Montgomery, *History* (as in n. 10) 91; W.E. Heitland, *The Roman Republic* I (Cambridge 1923) 241, 255; Michael Grant, *History of Rome* (New York 1978) 117; William G. Sinnigen and Arthur E.R. Boak, *A History of Rome to AD 565* (6th ed. New York 1977) 111; Henry G. Liddell, *A History of Rome* (New York 1879) 315.

15 Livy 21.7.5-6, 21.8.2-6, and 21.11.2-10 includes specific mention of battering rams (*aries*), mantlets (*vinearum*), catapults (*catapultis*), stone throwers (*ballistis*), and a mobile high tower (*turris mobilis*); 21.12.2-3 also describes the use of rams. See also Zonaras 8.21.

16 Cottrell, *Hannibal* (as in n. 10) 28, actually describes Hannibal dragging siege weapons with him over the Alps!

17 H.H. Scullard, *A History of the Roman World* (4th ed. London 1980) 220; Luciano Laurenzi, "Perchè Annibale non assediò Roma: Considerazioni archeologiche," *Studi Annibalici* (Cortona 1964) 141-151; Carcopino, *Profils* (as in n. 6) 211; Homo, *Primitive Italy* (as in n. 10) 290-291. For a discussion of the defenses of Rome at this time see Malcolm Todd, *The Walls of Rome* (London 1978) 17-20.

and Cary doubted Hannibal's ability to capture even the smallest towns.[18]

A careful reading of the sources, however, gives a different picture of Hannibal's siege capability. Lazenby notes that there is abundant evidence in the sources that Hannibal not only used siege weapons throughout his campaigns in Italy, but that he could have them built when needed.[19] Appian reports the use of siege engines in Hannibal's attack on the town of Petilia shortly after the battle of Cannae.[20] Livy also makes various references to siege weapons used by Hannibal in his narrative of later operations in Italy. One such instance was during one of Hannibal's attempts at capturing Nola in 216 B.C. Hannibal reportedly ordered his men to bring up all the equipment needed for an assault on the town.[21] This assault failed and Hannibal immediately moved on to Acerrae, where he made preparations for a siege and an assault. In addition, the town was circumvallated.[22] Hannibal subsequently captured Acerrae. In operations later that same year, Livy notes that Hannibal used mantelets and dug saps during his assault on Casilinum.[23] These efforts were unsuccessful and so Hannibal was forced to resort to blockading the city during the winter, but captured it early the following spring.[24] The following year, in 215 B.C., Hannibal made an attempt to capture Cumae and use it as a naval base. Hannibal reportedly had to delay his assault for one day in order to bring up the necessary equipment from his camp.[25] During the actual assault, Livy describes the use of a high wooden tower by the Carthaginians which the Roman commander Gracchus countered by building a tower on the wall.[26] One of the more famous incidents of the war was Hannibal's capture of Tarentum, by treachery, in 212 B.C. Many commentators have pointed to this event as evidence of Hannibal's inability to use siege weapons. However, these same commentators have failed to notice that, after seizing the lower town, Hannibal used artillery and siege engines in his attack on the citadel of the city.[27]

Many writers have also assumed that, in order to use siege weapons, it was necessary for Hannibal to drag these machines around with him because, if lost, they were irreplaceable. However, an examination of the siege methods used at that time shows this not to be the case. The Hellenistic era brought about great

18 B. H. Warmington, *Carthage* (rev.ed. New York 1969) 201; M. Cary, *The Geographic Background of Greek and Roman History* (Oxford 1949) 112.
19 Lazenby, *Hannibal's War* (as in n. 10) 87.
20 App. *Hann.* 5.29.
21 Livy 23.16.11-12.
22 Livy 23.17.4-6.
23 Livy 23.18.8-9.
24 Livy 23.19.1-17.
25 Livy 23.36.5-8.
26 Livy 23.37.2-3.
27 Livy 25.11.10; Polyb. 8.34.1-2; App. *Hann.* 6.33.

advances in the siege capabilities of western armies. The Carthaginians, in fact, were among the leaders in developing and improving siege technology.[28] Many new types of siege weaponry were developed, as well as more sophisticated methods for employing them. During this era, there were many 'siege experts' available who would hire themselves out to whomever was willing to pay for their services.[29] Considering Carthage's reliance on mercenary soldiers during the Punic Wars, it is hard to believe that she would not supply her armies with these individuals. These experts were the most important factor in the conduct of siege warfare. The actual equipment used was made of wood and could be built on site when needed.[30] Such an instance, in fact, is reported by Livy during Hannibal's attack on Locri in 205 B.C., where he notes that the Carthaginians built their siege equipment right on the spot.[31]

We see from the above examples that Hannibal's siege capability was not as feeble as historians have made it out to be. In fact, throughout his campaigns in Italy, Hannibal had captured many towns by direct assault. However, historians have only focused on those assaults which were unsuccessful. Hannibal must have known that a successful campaign in Italy would necessitate the capture of various towns by siege assault. How realistic, then, is it to suppose that a man possessing such sophisticated military abilities, as Hannibal did, would deliberately undertake a war with a handicap in such a critical area as siege warfare? The historical tradition that Hannibal was unable to wage siege warfare may be another one that can be attributed to Livy, who tended to play up Hannibal's siege failures for patriotic reasons. In fact, one of the battles between Marcellus and Hannibal at Nola which Livy describes is probably fictitious.[32] Subsequent historians may be guilty of following Livy too closely on this point. The argument that Hannibal was not able to capture cities is neither borne out by a careful reading of the sources nor by a realistic assessment of the capabilities of armies during the Punic Wars era.

Even allowing for the fact that Hannibal's army possessed an adequate siege-capability, some historians have noted other difficulties confronting Hannibal which would diminish the prospects for a successful siege of Rome. Errington, Lazenby, Niebuhr and De Sanctis have noted the long distance from Cannae to Rome, which is at least 250 miles. Even if Hannibal's army could march 20 miles a day, it still would have taken it at least two weeks to reach Rome, thus losing the element of surprise, as well as allowing the Romans a

28 P. Connolly, *Greece and Rome at War* (Englewood Cliffs, NJ 1981) 279.

29 Onasander, *Strategikos* 42.3.

30 Lazenby, *Hannibal's War* (as in n. 10) 87. See also W.W. Tarn, *Hellenistic Military and Naval Developments* (Cambridge 1930) 120.

31 Livy 29.7.4.

32 Connolly, *Greece and Rome* (as in n. 28) 191.

sufficient amount of time to strengthen their defenses further.[33] Such steps were, in fact, taken after the initial shock of the defeat at Cannae had subsided.[34] It should also be noted that a rate of march of 20 miles per day would be an extremely optimistic estimate, based on the maximum performance of an army. Polybius provides a more realistic rate of march when he states that it once took Hannibal's army ten days to march 800 stades.[35] This would be a rate of about $8\text{-}10^1/_2$ miles per day.[36] Another consideration is that Hannibal's army would also be moving through enemy territory. When Hannibal later attempted such a march through hostile territory in 211 B.C., in an attempt to draw Roman attention away from the city of Capua, he found that Roman colonists had destroyed the bridges in his path in order to impede his progress.[37] Thus, the basic physical limitations of time and space would have deprived Hannibal of the possibility of making an immediate attack on the city of Rome. If Hannibal was going to make a serious attempt at capturing the city, he had to plan on an extensive and long-term siege.

Some commentators believed that a long siege of Rome was not a feasible option for Hannibal. Delbrück, Picard, Lazenby, Bradford, Hoffmann and Morris have argued that Hannibal's army was simply not large enough to invest Rome effectively, given the size of the city and its garrison.[38] Delbrück, Lamb, Thiel, and Picard also believed that an effective blockade of Rome was impossible as long as she maintained contact with the sea by the Tiber. In order to place Rome under an effective blockade, Hannibal would also require a sizable fleet to keep Roman naval support away.[39] This last argument assumes that Ostia was the main port of Rome at this time. Throughout the Punic Wars, Ostia

33 R. Errington, *The Dawn of Empire* (Ithaca 1972) 75; De Sanctis, *Storia* (as in n. 14) 203. See also Lazenby, *Hannibal's War* (as in n. 10) 85-86; B.G. Niebuhr, *Lectures on the History of Rome* II (ed. by L. Schmitz, London 1849) 115.

34 Livy 23.25.1-10; Polyb. 3.118.7; Plut. *Vit. Marc.* 9.2; App. *Hann.* 5.27; Zonaras 9.2.

35 Polyb. 3.50.1.

36 Connolly, *Greece and Rome* (as in n. 28) 161. D. Proctor (*Hannibal's March in History* [Oxford 1971] 26-34) estimated an average rate of march of 20 kilometers (12.5 miles) per day for Hannibal's entire march from Spain to Italy. Walbank (as in n. 10) 366-367, suggested that Hannibal may have deliberately varied the speed of his march to confuse the Romans. Vegetius (1.9) stated that troops should cover 20 Roman miles (18 miles) in about 7 hours (*horis quinque dumtaxat aestivis*).

37 Livy. 26.9.3-4; App. *Hann.* 6.40.

38 Delbrück, *History of the Art of War* (as in n. 10) 337-338; G. Charles-Picard, *Hannibal* (Paris 1967) 180; Lazenby, *Hannibal's War* (as in n. 10) 86; Bradford, *Hannibal* (as in n. 14) 118; Morris, *Hannibal* (as in n. 14) 181; W. Hoffmann, *Hannibal* (Göttingen 1962) 73. However, Plutarch (*Vit. Marc.* 13.2) indicated that the Romans did not have enough men to defend the walls.

39 Lamb, *Hannibal* (as in n. 14) 105; Charles-Picard, *Hannibal* (as in n. 38) 180; J. H. Thiel, *Studies on the History of Roman Sea-Power in Republican Times* (Amsterdam 1946) 61, n. 81.

was still an outpost at the end of the Tiber River. It did not develop into a major port until the time of the emperor Claudius. During this time, Puteoli served as the port of Rome, although it is about 120 miles south of Rome. Access to this port could have been very easily cut off by any besieging army simply by blockading any of the roads leading into the city from the south. It is also well known that the Tiber is neither very deep nor wide at Rome and is only navigable by barges or sea-going vessels of light draught at this point. An attacker could either erect a boom and chain across the river or sink barges in order to stop river traffic.[40] Thus, a sea-going navy was not necessary for an effective siege of Rome.

Of all the problems associated with a march on Rome, probably the single greatest issue is the question of supply, yet surprisingly few authors have dealt with this topic. Dorey, Dudley, Grant and Delbrück, as well as Armstrong, have recognized that a siege of Rome would have produced insurmountable supply difficulties, but failed to grasp the significance that logistics had for Hannibal's decisions, not only for a march on Rome, but for his conduct of the war as a whole.[41] Operating deep within hostile territory without a base, and effectively cut off from any outside support, Hannibal had to concern himself with the rudimentary problem of keeping his army fed on an almost daily basis. It is the contention of this article that the lack of a logistical base had a profound impact on Hannibal's conduct of the war in Italy, especially during the period preceding the battle of Cannae. The need for provisions was a key consideration behind many of the moves which Hannibal's army made and, ultimately, restricted his freedom of movement, as well as forcing him to forego many strategic options which might have had a decisive impact on the outcome of the war.

An Elephant Marches on Its Stomach

The only comprehensive study ever done on the logistics of ancient armies was Donald Engels' 1978 work *Alexander the Great and the Logistics of the Macedonian Army*. Engels recognized that any full appreciation of Alexander's military successes requires an understanding of the logistical problems which Alexander overcame in order to achieve his spectacular marches and victories.

40 Hannibal threw a chain across the Volturnus River to stop supplies from reaching the defenders of Casilinum in 216 B.C. (Frontin. *Str.* 3.14.2; Livy 23.19.7-12; Zonaras 9.2). Cary, *Geographic Background* (as in n. 18) 130-135, stated that the Tiber is no more than 100 yards across at Rome.

41 Dorey and Dudley, *Rome Against Carthage* (as in n. 14) 67-68; Delbrück, *History of the Art of War* (as in n. 10) 338; Armstrong, *The Reluctant Warriors* (as in n. 14) 42; Grant, *History of Rome* (as in n. 14) 117.

Like Hannibal, Alexander was operating deep within enemy territory, advancing farther and farther away from his own home bases. Unlike Hannibal, Alexander was able to consolidate and draw supplies from conquered areas, which enabled him to continue his invasion of the Persian Empire. Hannibal, on the other hand, was operating for over two years in Italy without any kind of a base on which to draw. Before the defection of Roman allies in the aftermath of Cannae, the only areas controlled by Hannibal's army were the ones they physically occupied at any given time. Without the support of allies who could provide an ongoing system of provisioning his army, Hannibal was not able to remain in any one place for an extended period of time. He could only feed his men with whatever supplies were immediately on hand in any given region. Once these supplies were exhausted, Hannibal was forced to move on to the next area to continue to gather in more supplies. It is no wonder that both Polybius and Livy describe Hannibal's campaigns as consisting, in the main, of 'ravaging' the Italian countryside in order to goad the Roman armies into fighting him. What Hannibal was carrying out was not wanton destruction for its own sake, but a necessary operation for the continued maintenance of his army.

The daily supply needs for an army the size of Hannibal's were considerable. Engels developed a formula for determining the equivalent needs for Alexander's army. We may, therefore, use Engels' figures to determine the nutritional needs for Hannibal's army as well. A soldier required a minimum of 3 lbs. of grain and 2 qts. of water per day in order to maintain fighting effectiveness. A cavalry horse or a pack-animal (either a mule, horse or a donkey) would have similar nutritional requirements, namely, 10 lbs. of forage (straw or chaff), 10 lbs. of grain and 8 gallons of water per day.[42] Thus, the total amount of supply needed to feed Hannibal's entire army is determined by multiplying the above figures by the total number of people and animals present.

The sources provide varying estimates for Hannibal's army at different points in time. Some of these differences can be attributed to the effects of battle casualties and attrition. In determining the number of soldiers present in Hannibal's army, the number of non-combatants marching with the army should

42 D. Engels, *Alexander the Great and the Logistics of the Macedonian Army* (Berkeley and Los Angeles 1978) 18-19 and 144-145; James Blakely and David H. Bade, *The Science of Animal Husbandry* (4th ed. Reston, Va. 1985) 585-593. The army could provide its herd with the needed forage by allowing the animals to graze periodically during the daily march. It takes an equine approximately 1 $^{1}/_{2}$ hours to consume 10 lbs. of forage. The most likely procedure would have been to halt the column 2 or 3 times a day to allow the animals to graze and rest. In light of the known fertility of pasturage in Italy and mountainous regions in general, the most forage available per acre was approximately 1 ton or 2,000 lbs. Thus, one acre could supply enough forage for 200 animals per day. I am grateful to Dr. C. Melvin Reitnour for providing me with this information.

also be taken into account. The sources do not contain any explicit references to the camp followers accompanying Hannibal's army.[43] For our purposes, however, a reasonable number may be calculated based on the experiences of other ancient armies. Engels noted that both Philip II and Alexander forbad their troops to take their wives with them on campaign, in order to enable the army to move quickly.[44] We have no report of Hannibal issuing any such instructions to his troops. He did, however, grant his Spanish troops leave to visit their families before setting out, which would imply that families were not welcome to come along.[45] Despite these precautions, it is likely that a considerable number of camp followers accompanied the army. In many of the armies of antiquity, it was the common practice of soldiers to have servants accompany them, in order to carry their equipment and perform some domestic chores.[46] In addition, many other people providing services varying from the sensual to the spiritual would attach themselves to the army along the way. Engels used a rough estimate of one camp follower to every three soldiers in Alexander's army, which we can adopt here, for want of a better estimate.[47]

The estimate of the total number of animals accompanying the army must not only include the mounts for the cavalry, but also the pack-animals used to carry food and needed equipment. Hannibal tried to keep the number of pack-animals in his army to a minimum by ordering his men to leave behind in Spain all the booty they had acquired from the successful siege of Saguntum, and limited transport to the most essential equipment.[48] Once again, the sources do not report the exact number of pack-animals in Hannibal's army, but we can make a reasonable estimate on the basis of certain facts, including the practices of other ancient armies. Also absent from the sources is any mention of the use of wagons in Hannibal's army. This could be no more than a careless omission of such a mundane detail on the part of ancient authors. On the other hand, it is not unlikely that Hannibal dispensed with wagons altogether. Although each wagon had the carrying capacity of four mules, it also had many drawbacks which offset this advantage.[49] Much has been written about the inefficiency of

43 However, Polybius (3.82.8) notes that there were more non-combatants than soldiers in Flaminius' army before the battle of Lake Trasimene.

44 Engels, *Alexander the Great* (as in n. 42) 12-13.

45 Livy 21.21.1-9.

46 W.K. Pritchett, *The Greek State at War* I (Berkeley 1971) 41, 49-51; Engels, *Alexander the Great* (as in n. 42) 12-13.

47 Engels, *Alexander the Great* (as in n. 42) 13 and 18. This ratio may actually be too generous when applied to Hannibal's army. If one considers the arduous nature of the march he undertook, especially over the Alps, which would have been a sufficient discouragement to the fainthearted, his army may well have had fewer camp followers than normal.

48 Livy 21.60.8-9; Polyb. 3.76.5-6.

49 K.D. White, *Greek and Roman Technology* (London 1984) 129; K. Greene, *The Archaeology of the Roman Economy* (London 1986) 39.

ancient horse collars, which many authors claim were mere adaptations from those used for oxen. Such collars tended to force the horse to pull with its neck, thus restricting its breathing and reducing the animal's power to only 25% of its potential.[50] However, recent experiments using harnessing techniques from ancient carvings show this not to be the case. Even though the ancients did possess harnesses for horses which threw the weight of the load onto their chests rather than their necks, they preferred to use oxen for pulling heavy loads. Horses tended to be expensive and usually were restricted to pulling lighter, faster vehicles. Oxen were not only more plentiful, but they were also cheaper to feed and their hooves allowed them to negotiate soft ground with less difficulty.[51] On the other hand, oxen could only travel at the rate of 2mph, thus seriously hampering the speed of any army.[52] Wagons would also have easily become bogged down in some of the rough terrain that Hannibal had to traverse, especially in the Alps, where his men once had to work for four days in clearing a path sufficient for his troops and pack-animals to use.[53]

Mules were much faster than oxen and could travel up to 49 3/4 miles per day.[54] For most of antiquity, animals were more commonly used to carry loads rather than pull vehicles. The three most common beasts of burden – donkeys, mules and horses – could, with panniers, carry a maximum load of 200, 300 and 400 lbs. respectively.[55] Pack-animals were used most often in rough terrain areas, such as central Italy and Greece.[56] During the First World War, the British Army found that, when using pack-animals in rough or hilly terrain, it had to reduce the maximum loads of these animals by about 25%.[57] Given all the above facts, we can assume that Hannibal relied on pack-animals as his sole means of transport, for both comestibles and equipment. We can then estimate the total number of pack-animals he used by estimating an average weight capacity for each pack-animal and then multiplying this figure by the daily and weekly supply needs of his army. Horses were scarce and needed for the cavalry, so we can assume that donkeys and mules were the most common type

50 J. G. Landels, *Engineering in the Ancient World* (Berkeley 1978) 175; Greene, *Archaeology* (as in n. 49) 39.

51 Landels, *Engineering* (as in n. 50) 177-178; Greene, *Archaeology* (as in n. 49) 39.

52 Engels, *Alexander the Great* (as in n. 42) 15; C. Clark and M. Haswell, *The Economics of Subsistence Agriculture* (London 1970) 205; L. White, *Medieval Technology and Social Change* (Oxford 1980) 61-68.

53 Livy 21.36.1-21.37.6; Polyb.3.54.5-3.55.9.

54 Greene, *Archaeology* (as in n. 49) 39; Landels, *Engineering* (as in n. 50) 172.

55 White, *Technology* (as in n. 49) 129. Other writers estimate 200 lbs. as a reasonable carrying weight for mules and horses. See Greene, *Archaeology* (as in n. 49) 39; Engels, *Alexander the Great* (as in n. 42) 14-15; Landels, *Engineering* (as in n. 50) 171-173; Clark and Haswell, *Economics* (as in n. 52) 204.

56 Greene, *Archaeology* (as in n. 49) 39.

57 Landels, *Engineering* (as in n. 50) 172.

of pack-animal used. Since Hannibal was doing most of his campaigning in rough terrain, we will use an average carrying capacity of 200 lbs. for each pack-animal.

The total number of animals needed for carrying food can be estimated by dividing the daily nutritional needs of the army by the average carrying capacity of each of the pack-animals. Since the pack train would have to carry its own food, the average carrying capacity of each animal would have to be reduced for each day in which it carries its own food. Thus, the greater the number of days the army has to travel before resupply, the greater the number of animals needed to make up for the loss in the carrying capacity of the baggage train. In addition to the number of animals required for carrying food, an additional number was needed to carry various types of essential equipment. The estimate of the total number of animals needed to carry non-comestibles, however, will have to be based on the experiences of other ancient armies. Some of this equipment, such as tools, medical supplies and cooking utensils, could have been carried by the soldiers or their attendants, while heavier materials, such as tents, metal parts for siege equipment, firewood, booty, etc., would have to be carried by pack-animals. In the Roman Imperial army, the number of animals used to carry this type of equipment varied from 520 to 800 to 1500 animals per legion.[58] Since Hannibal wanted to restrict this type of baggage to the essentials, we can adopt Engels' minimal estimate of one animal for every fifty men.[59]

Based on the above information, we can construct tables showing the supply needs and the number of animals required by Hannibal's army with respect to the different strengths reported for his army at various moments in the campaign:

Table I

Daily supply needs for Hannibal's army when consisting of 90,000 infantry and 12,000 cavalry.[60]

	Total Number	x Wt. of Ration =	Totals
People	136,000[61]	3 lbs.	408,000
Cavalry Horses	12,000	10 lbs.	120,000
Pack-animals	2,720	10 lbs.	27,200
Total			555,200
Total number of pack-animals needed for:		One day =	2,922
		One week =	29,895
		Ten days =	55,520

58 J. Harmand, *L'armée et le soldat à Rome* (Paris 1967) 156; Engels, *Alexander the Great* (as in n. 42) 17.

59 Engels, *Alexander the Great* (as in n. 42) 18.

60 Polyb. 3.35.1-2; Livy 21.23.1-2; App. *Hann.* 1.4.

61 Where 136,000= 90,000 infantry + 12,000 cavalry + 34,000 camp followers.

Table II

Daily supply needs of Hannibal's army when consisting of 50,000 infantry and 9,000 cavalry.[62]

	Total Number x	Wt. of Ration =	Totals
People	80,000[63]	3 lbs.	240,000
Cavalry horses	9,000	10 lbs.	90,000
Pack-animals	1,600	10 lbs.	16,000
Total			346,000
Total number of pack-animals needed for:		One day =	1,821
		One week =	18,630
		Ten days =	34,600

Table III

Daily supply needs of Hannibal's army when consisting of 38,000 infantry and 8,000 cavalry.[64]

	Total Number x	Wt. of Ration =	Totals
People	61,000[65]	3 lbs.	183,000
Cavalry horses	8,000	10 lbs.	80,000
Pack-animals	1,220	10 lbs.	12,200
Total			275,200
Total number of pack-animals needed for:		One day =	1,448
		One week =	14,818
		Ten days =	27,520

Table IV

Daily supply needs of Hannibal's army when consisting of 20,000 infantry and 6,000 cavalry.[66]

	Total Number x	Wt. of Ration =	Totals
People	35,000[67]	3 lbs.	105,000
Cavalry horses	6,000	10 lbs.	60,000
Pack-animals	700	10 lbs.	7,000
Total			172,000
Total number of pack-animals needed for:		One day =	905
		One week =	9,262
		Ten days =	17,200

62 Polyb. 3.35.7-8.
63 Where 80,000 = 50,000 infantry + 9,000 cavalry + 21,000 camp followers.
64 Polyb. 3.60.5.
65 Where 61,000 = 38,000 infantry + 8,000 cavalry + 15,000 camp followers.
66 Polyb. 3.56.4.
67 Where 35,000 = 20,000 infantry + 6,000 cavalry + 9,000 camp followers.

Table V

Daily supply needs of Hannibal's army when consisting of 34,500 infantry and 9,800 cavalry.[68]

	Total Number	x Wt. of Ration =	Totals
People	59,000[69]	3 lbs.	177,000
Cavalry horses	9,800	10 lbs.	98,000
Pack-animals	1,180	10 lbs.	11,800
Total			286,800
Total number of pack-animals needed for:		One day =	1,509
		One week =	15,443
		Ten days =	28,680

The above tables show the minimal number of pack-animals needed by Hannibal's army at different levels of strength. These figures assume that it was not necessary for the army to carry water or the additional 10 lbs. of forage each animal required every day. Such a need would only have arisen if the army marched through desert or uncultivated areas. As we shall see shortly, Hannibal usually confined his operations to agricultural regions to meet these daily needs. Any situation which required more provisions to be carried would require a greater number of animals to carry them. Theoretically it was possible for the pack-animals to carry supplies to last the army for 19 days. However, the number of animals needed for such a feat is so great that it is unlikely that so many animals could be acquired in Italy. In addition, no single area was likely to contain enough forage to feed all these animals. Table V is based on the strength of Hannibal's army immediately after the battle of Cannae. Earlier we noted that the battlefield was about 250 miles away from the city of Rome. If Hannibal planned to attack Rome immediately after the battle, his army would have to march more than 13 miles per day in order to reach the city within 19 days. Based on the above calculations, if Hannibal wanted to make a continuous march, without taking forage into account, he would require 544,920 pack-animals to carry all the food his army would need! Because the pack-animals would have to carry their own food, the tables show that the longer the army wanted to go before replenishing, the less each animal could carry to feed the army and the greater the number of animals needed to make up for the reduced carrying capacity. The tables also show that, in each case, the additional amount of supply needed beyond one week and up to ten days almost doubles the total

68 40,000 infantry and 10,000 cavalry (Polyb. 3.114.5) minus the loss of 5500 infantry and 200 cavalry at the battle of Cannae (Polyb. 3.117.6.).

69 Where 59,000 = 34,500 infantry + 9,800 cavalry + 14,700 camp followers.

number of animals required to carry it. The larger the size of Hannibal's army, the more frequent the need to resupply. It is unlikely that Hannibal could have had more than 20,000 pack-animals at any one time.[70] A comparison of this number with the tables above shows that Hannibal would rarely have been able to carry enough supplies to feed his army for more than a week. Therefore, when his army's supply needs started exceeding this limited carrying capacity, Hannibal was forced to confine his operations to raiding the Roman larder rather than trying to win the war. In light of these overall logistical limitations, it is not surprising that Hannibal was forced to forego a march on Rome after the battles of Lake Trasimene in 217 B.C. and Cannae in 216 B.C. The lack of a permanent base of supply made such operations impossible.

Hannibal's logistical problems dogged him at almost every step in his early campaigns in Italy. The accounts of Livy and Polybius are filled with references to his supply problems, yet few historians have understood that the ongoing need to procure provisions played a large part in many of Hannibal's decisions and troop movements. A re-examination of the primary accounts will illustrate to what extent logistics controlled Hannibal's actions.

What about the Elephants?

Before proceeding with a discussion of Hannibal's operations, a brief note about Hannibal's elephants would be in order. Appian reports that Hannibal set off from Spain with 37 elephants in his army.[71] These were, most likely, North African forest elephants, which are much smaller than their Indian counterparts, and now extinct. These animals placed a severe burden on Hannibal's logistical system. A wild African elephant can consume as much as 300-350 lbs. of forage per day. In captivity or during periods of inactivity, however, they only require about 100 lbs. of hay, with some supplementary forage.[72] Based on our earlier calculations, the minimal number of pack-animals needed to supply these beasts is:

70 Dodge, *Hannibal* (as in n. 14) 229 and 235, states that Hannibal's pack train must have numbered about 10,000 animals but provides no detailed explanation for this figure. Table IV shows that such a number of animals could have supplied Hannibal's army for a week when its strength was 20,000 infantry and 6,000 cavalry, which was the total combat strength of the Carthaginian army when it completed its crossing of the Alps (Polyb. 3.56.4).

71 App. *Hann.* 1.4.

72 H. H. Scullard, *The Elephant in the Greek and Roman World* (Ithaca, N.Y. 1974) 20.

	Total Number	x Wt. of Ration =		Total
Elephants	37	100 lbs.		3,700
Total number of pack-animals needed for:			One day =	19
			One week =	199
			Ten days =	370

From these figures we can see that the elephants placed a huge demand on Hannibal's precious pack-animals. Hannibal obviously felt that the battle worth of the elephants justified the trouble of bringing them to Italy. One way he could have economized on animal carrying capacity was to allow the elephants more time to forage, which probably slowed down the army's rate of march. The only area where foraging was limited was near the summit of the Alpine passes. In fact, the African elephant is skillful in mountainous country and can even negotiate narrow ledges, a fact which makes their passage of the Alps hardly surprising.[73] Nevertheless, none of the elephants, save one, survived their first winter in Italy, which, from a logistical standpoint, may well have been a blessing in disguise.

The Logistical Campaigns of Hannibal

J. Seibert noted the many references in the sources to Hannibal's belief that his brother Hasdrubal, whom he left in command in Spain, would provide him with support and reinforcements from that country. He also noted the archaeological evidence which shows the presence of Carthaginian garrisons in southern France. From this, Seibert concluded that the Carthaginians had, in fact, established a 'province' in southern Gaul which they intended to use as a supply base for Hannibal's campaigns in Italy. Seibert also argued that the Gauls were a part of this scheme, both in Gallia and Gallia Cisalpina, and provided the Carthaginians with troops and supplies throughout the war. The Carthaginians planned to have, in effect, a supply line over the Alps.[74]

Such an argument does have some basis in the sources. The Romans did, in fact, anticipate that the Carthaginians would attempt to use Spain as a base from which to attack Italy. The sources report that Hasdrubal had always intended to leave Spain in order to join his brother in Italy. To counteract this, the Romans

73 Scullard, *Elephant* (as in n. 72) 19.

74 J. Seibert, "Zur Logistik des Hannibal-Feldzuges: Nachschub über die Alpen?," *Studia Phoenicia X: Punic Wars – Proceedings of the Conference held in Antwerp from the 23rd to the 26th of November, 1988, in cooperation with the Department of History of the 'Universiteit Antwerpen' (U.F.S.I.A.)*, edited by H. Devijver and E. Lipinski, Leuven, Uitgeverij Peeters, 1989, pp. 213-221.

planned to send an army into Spain at the very beginning of the war and, despite the presence of Hannibal in Italy, maintained an active field force there throughout the conflict. The primary mission of the Roman armies in Spain was to prevent any kind of support reaching Hannibal from that quarter. Roman commanders in Spain forced Hasdrubal to postpone his plans year after year. Eventually, Hasdrubal was able to get past Roman forces and make his march into Italy after Scipio failed to stop him at Baecula in 209 B.C.[75]

Seibert is also correct in noting that the Gauls provided a great deal of assistance to Carthaginian forces throughout the war. Not all the Gallic tribes, however, were enthusiastic in their support of Carthage, and many were duplicitous in the extreme. Hannibal was forced to battle with the Gauls throughout his march from Spain to Italy. In light of these facts, it is unlikely that Hannibal could have seriously planned on continuous logistical support from outside Italy. The distances to be covered over land were too great to make such an operation feasible. In addition, Roman naval supremacy would have made overseas supply equally uncertain.[76] Polybius reports that Hannibal was well aware of the difficulties involved in invading Italy and knew that his chief problem would be supply.[77] A realistic assessment of the situation shows that Hannibal would have to provide for his army from local sources. Such a strategy had tremendous risks. Living off the land, or foraging, might satisfy the needs of the army in the short term, but could pose problems if relied upon for extended periods of time. Hannibal planned to win quickly and decisively. For a quick campaign, foraging would suffice. A line of communications stretching for hundreds of miles was not necessary. A careful reading of the sources shows that this, in fact, was what he anticipated and, therefore, he planned his campaign accordingly.

These plans are evident at the very outset of the war. Hannibal undertook the siege of Saguntum, the *casus belli* of the war, as a preparatory step to his invasion of Italy. The territory of Saguntum was reputed to be the most fertile in Spain and Hannibal wanted to secure it in order to provide his expedition with abundant supplies and money. In addition, he would also be denying the Romans an important base from which they could attack Spain.[78] Hannibal

75 Curiously, both H.H. Scullard (*Scipio Africanus: Soldier and Politician* [Ithaca, N.Y. 1970] 68-85) and B.H. Liddell Hart (*A Greater Than Napoleon – Scipio Africanus* [New York 1927] 44-55) consider this battle a victory for Scipio even though he failed to accomplish his strategic mission. See also F.E. Adcock, *The Roman Art of War under the Republic* (Cambridge, Mass. 1940) 109.

76 For a discussion of the naval aspects of the war, see W.L. Rodgers, *Greek and Roman Naval Warfare* (Annapolis, Md. 1937) 308-375; Thiel, *Studies* (as in n. 39) 32-198; Homo, *Primitive Italy* (as in n. 10) 289-290.

77 Polyb. 9.24.4-5.

78 Polyb. 3.17.3-7; Livy 21.7.2; Caven, *Punic Wars* (as in n. 10) 87; Adolfo J. Domínguez-Monedero, "La campaña de Anibal contra los Vacceos: sus objetivos y su relación con el inicio de la segunda guerra púnica," *Latomus* 45 (1986) 241-258.

further prepared for his invasion by obtaining information on the fertility of the land at the foot of the Alps and near the river Po.[79] This fact alone is sufficient to prove that Hannibal fully intended to live off the land and not rely on any outside source of supply. Hannibal also sent emissaries to the various Gallic chieftains along his proposed line of march. The Carthaginian emissaries bribed these chieftains to guarantee safe passage through their territories.[80] It is probable that these chieftains were also paid to provide supplies for Hannibal's army at different points along their journey, as the Brixian Gauls did for the Romans at the Tannetum River.[81] When Hannibal reached the Rhône, he relied upon the local Gauls to provide the boats which enabled his army to cross.[82]

To make the passage of the Alps as easy as possible, Hannibal employed some local guides who promised to lead the Punic army through hospitable country.[83] Polybius points out that the Alps were not as foreboding as many popular writers would have their readers think. Hannibal, Polybius argues, used sound judgment in his selection of a route across the Alps, taking into account the fertility of the country through which they intended to pass.[84] Here, again, we have an explicit reference to the importance Hannibal placed on logistical preparation in formulating his decisions. Some of the incidents which are described on the march to Italy are better understood when seen in the context of supply. Logistics probably played a major role in the decision of the Carthaginian army to pause at the 'island', a land mass in the middle of the Rhône River of indeterminate location and well known for its fertility.[85] Here, Hannibal became involved in a dispute between two brothers over the kingship of a local tribe. Hannibal decided the issue in favor of the brother named Branus and was handsomely rewarded for this service by having his army totally refitted with new weapons, warm clothing for the Alpine climb, and plenty of food.[86] A glance at the preceding tables will at once show that Branus was indeed a chieftain of great wealth to be able to distribute such munificence to an army the size of Hannibal's. It is more likely that Hannibal had previously made arrangements for these supplies. In any case, the whole incident emphasizes the extent to which logistics determined the path of the march into Italy.

79 Polyb. 3.34.1-3.

80 Polyb. 3.34.1-6, 3.41.7-8; Livy 21.23.1, 21.24.3-4.

81 Livy 22.25.14.

82 Polyb. 3.42.1-3; Livy 21.26.7-8. Livy states that the Gauls were anxious to speed Hannibal along so that they might be relieved of the burden of supplying his army.

83 Polyb. 3.44.7-8.

84 Polyb. 3.48.1-12. See also Cary, *Geographic Background* (as in n. 18) 108-109.

85 This paper will make no attempt to add to the controversy as to which route Hannibal took over the Alps. For a discussion of this literature, see Proctor, *Hannibal's March* (as in n. 36); Walbank (as in n. 10) 382-387.

86 Polyb. 3.49.5-13; Livy 21.31.4-8.

Hannibal was wise to make the logistical preparations he did, for the passage of the Alps brought about the loss of many men and animals, along with tremendous privations for the survivors. At one point, while passing through a narrow pass, the baggage train was attacked by the local tribesmen. Many pack-animals were lost from falling over the precipices. Hannibal came close to losing his entire supply train in this attack. Nevertheless, the Carthaginians repelled the tribesmen and later captured their villages, which provided enough grain and livestock to last the army for three days.[87] This fact shows, once again, that Hannibal was leading his army by a route where he believed provisions were available. The passage of the Alps would eventually take Hannibal's army two weeks. If forage was totally unavailable in the Alps, these mountains would have been virtually impassable.

During the following days, the inhabitants of the region, sufficiently cowed by Hannibal's actions, continued to supply the Punic army with grain and animals.[88] However, this was to prove deceptive as the Carthaginian army later underwent a more serious attack in a narrow defile. Hannibal anticipated this attack and accordingly placed his cavalry at the head of the column with the supply train, followed by the infantry. Despite these precautions, the Carthaginians still lost a large number of animals and men from these attacks. Hannibal, in fact, was cut off from his cavalry and baggage train for one night. For the remainder of the climb to the summit, Hannibal's supply train continued to undergo a steady attrition from these harassing attacks, except for those points in the column where the elephants were present.[89]

The descent from the Alps brought as many problems as the ascent. Many pack-animals became bogged down in the soft snow which had fallen on the downward slopes, forcing Hannibal's men to work for four days to make a suitable path for the animals. While this work was going on, there was no forage available and more animals were lost to starvation. Eventually, the Carthaginian army made the descent to the low country, where the army rested for three days while the remaining animals were put out to pasture.[90] Hannibal reported that the passage of the Alps not only cost an enormous number of men, but an even greater number of pack-animals. According to Polybius, Hannibal's army was now reduced to 20,000 infantry and 6,000 cavalry, information which Polybius obtained from an inscription left by Hannibal at the Lacinian Promontory.[91] In a postscript to the march Polybius states that Hannibal's men were in a decrepit state due to the effects of prolonged hunger brought about by

87 Polyb. 3.50.3 - 3.52.1; Livy 21.33.1-11.
88 Polyb. 3.52.1-7; Livy 21.34.1-4.
89 Polyb. 3.52.8 - 3.53.10; Livy 21.34.5 - 21.35.3.
90 Polyb. 3.54.4 - 3.55.9; Livy 21.36.1 - 21.37.6.
91 Polyb. 3.56.3-4; Livy 21.38.1-5. Livy reports that Hannibal lost 36,000 men.

scarcity of supplies. It was not possible to transport enough provisions for an army the size of Hannibal's, especially when coupled with the loss of so many pack-animals and everything they were carrying.[92] This statement underscores very clearly the logistical limitations which Hannibal was facing. The loss of so many pack-animals reduced the number of days during which the army could carry its own supply. This meant that the troops needed provisioning more and more frequently. If the army had to spend extended periods of time in the same area, supplies would quickly run out and the men would suffer. While campaigning in Italy, Hannibal prevented this by continually moving. The Alps presented a worst-case scenario. It was the most difficult terrain in which the Carthaginian army had to operate. The numerous problems which arose while crossing these mountains slowed the Punic army down and forced it to spend extended periods of time in areas where little food was available. These delays were, consequently, very costly in terms of men and animals. The loss of animals was especially deleterious, since this reduced the army's overall carrying capacity and forced Hannibal to restrict his operations to areas where provisions were readily available.

Hannibal's supply situation started to improve after the sharp cavalry battle at the Ticinus in 218 B.C., when the local Celts felt encouraged enough by the Carthaginian success to offer Hannibal support in the form of supplies and troops.[93] This support, however, was insufficient. When, in the face of Gallic defections, Scipio decided to abandon his camp and retreated to the other side of the Trebia, Numidian cavalry scoured the remains of Scipio's camp for what little it had to offer.[94] Hannibal followed Scipio and took up position nearby. Livy notes that, during this time, Hannibal was anxious over his supply situation, which was becoming worse every day. Hannibal temporarily relieved the situation by bribing the commander of the Roman garrison at Clastidium, thus seizing control of the granary there. Hannibal was also angered by the lukewarm support he was getting from some of the Gallic tribes and was forced to resort to raiding the surrounding district to keep his army fed.[95] Hannibal continued to have supply difficulties throughout his first winter in Italy. Polybius reports that this winter was so severe that many more men and animals were lost, including all but one of the elephants. In addition, Livy says that Numidian cavalry continued foraging the area throughout the winter. During this same winter, Hannibal made attacks on two different Roman depots, and succeeded in capturing and plundering the second one at Victumulae.[96] These incidents

92 Polyb. 3.60.1-7. Polybius reports that Hannibal had started his passage of the Alps with 38,000 men and 8,000 cavalry. Of this force, he lost half.

93 Polyb. 3.66.7.

94 Polyb. 3.67.8-3.68.4; Livy 21.48.3-6.

95 Polyb. 3.69.1-8; Livy 21.48.8-10, 21.52.3-6; Zonaras 8.24.

96 Polyb. 3.74.11; Livy 21.57.5-14; App. *Hann.* 2.7.

prove that Hannibal was not obtaining the support he expected from the Gauls, because they were either unwilling or unable to provide it. The preparations he had made to provide for his army had failed him. Despite marching for many months over hundreds of miles, as well as fighting major engagements along the way, Hannibal failed to establish an adequate supply base for his forces.

The following spring, in 217 B.C., Hannibal decided to continue his march into Italy. The problem was how to get past the Apennines mountain barrier. Roman armies stationed at Arretium and Ariminum blocked the only viable passes through these mountains. The only other alternative was to cross the marshes surrounding the Arno river, which would entail marching through water for four days. Hannibal was probably determined not to be forced to fight his way through mountainous country again, so he decided to take a gamble. Such a march could cost many men and animals, yet, as Polybius notes, he calculated that the region of Etruria, where his army would emerge, was fertile enough to enable his army to recover.[97] Here, again, we have another situation in which logistics played a major role in determining Hannibal's strategy and the region in which his army would operate.

The subsequent march through the marshes proved to be a disaster. Not only were many men lost, but almost all the pack-animals as well. Hannibal lost one of his eyes to ophthalmia. Many of the cavalry horses were rendered useless by fatigue.[98] Nevertheless, Hannibal had calculated correctly. His army emerged from the swamps into one of the most productive regions in Italy. Not surprisingly, he proceeded to plunder the region around Faesulae, and then moved on to the country between Cortona and Lake Trasimene.[99] The subsequent destruction of Flaminius' army at Lake Trasimene left the road to Rome open to the Carthaginians. Few commentators have chastised Hannibal for his failure to march on Rome at this time. This is probably because they assume that the existence of another Roman field army made this an unattractive option. The actual reason, however, is more mundane. Polybius states that the Carthaginians had not recovered from the hardships of their long march from Spain and the effects of spending the previous winter in the open. Add to this the difficult march through the swamps in the early spring and the fact that most of the men and animals were suffering from malnutrition. In short, the Punic army was exhausted and hungry and needed rest and recuperation. Accordingly, Hannibal spent the following few days foraging through Umbria and the area around Spoletium. His army eventually reached Picenum, a rich agricultural district, on the tenth day. Hannibal's men collected more provisions and animals than they could drive or carry. The Carthaginians finally encamped near the Adriatic

97 Polyb. 3.78.6-3.79.3. See also Cary, *Geographic Background* (as in n. 18) 123.

98 Polyb. 3.79.4-12; Livy 22.2.1-22.3.4.

99 Polyb. 3.80.1-5, 3.82.1-11; Livy 22.3.3-10, 22.4.1-2.

where they spent some time in recovering from the previous year's activities.[100] These actions show, once again, that logistics were driving Hannibal's decisions and forcing him to forego strategic opportunities. The effects of the previous year's problems were carrying over into the current year's campaigning. Hannibal was forced to take his army out of action for an extended period of time in order to resuscitate it. Now, instead of carrying out operations to try to win the war, he would be forced to concentrate on keeping his army fed.

The Lake Trasimene disaster forced the Romans to rethink their own strategy. Accordingly, they changed leadership and Fabius Maximus was made dictator. Fabius understood more clearly than many ancient and modern commentators the implications of Hannibal's supply situation. Instead of confronting the Carthaginians in full-scale engagements, the Romans would simply restrict Hannibal's ability to provision his army. This involved both the destruction of crops and supplies in the path of the Punic army, as well as the interception of Carthaginian foraging parties. By concentrating on denying supplies to the enemy, the Fabian strategy would eventually result in the total disintegration of the Carthaginian army. To carry out this policy, Fabius ordered the inhabitants of unfortified towns to move to safety. People who lived in the path of the Carthaginian army were ordered to destroy all buildings and crops to prevent them from falling into Hannibal's hands.[101]

The Carthaginians, on their part, having regained their strength and exhausted their provisions, continued foraging their way through Italy. Moving along the Adriatic coast, they passed through the territories of Praetutia, Hadriana, Marrucina and Frentana, until they eventually reached Arpi, in the plain of the Tavoliere, which was one of the richest grainlands in Italy.[102] Fabius moved his army to intercept Hannibal, encamping at Aecae, six miles away from the Carthaginians. Hannibal tried to draw the Romans into battle, but Fabius demurred. Hannibal had to keep moving to keep his army fed, and so entered Samnium, which was so fertile that the Carthaginians were not able to use or destroy all the provisions they had captured. The Punic army then moved into the territory of Beneventum and captured the unwalled city of Telesia, where they recovered a great deal of booty.[103] Hannibal next decided to move into the plain around Capua, which Polybius notes was the most celebrated in all of Italy, both for its beauty and fertility. Many of the seaports which bordered on the plain were important centers for overseas trade.[104] It is not surprising that this region played a major role in the later years of the war. Hannibal later relied

100 Polyb. 3.86.8-3.87.4, 3.88.1-6; Livy 22.9.1-5.

101 Livy 22.11.4-5; Zonaras 8.25; Plut. *Vit. Fab. Max.* 2.4-5; 5.1-3.

102 Polyb. 3.88.1-9; Livy 22.9.1-6; Dorey and Dudley, *Rome Against Carthage* (as in n. 14) 56.

103 Polyb. 3.89.1-3.90.9; Livy 22.13.1-2.

104 Polyb. 3.91.1-10; Cary, *Geographic Background* (as in n. 18) 133-138.

upon this area as his chief base of supply and was forced to devote most of his subsequent campaigning to maintain control of it.

During all these movements, Fabius' army shadowed the Carthaginians closely. Both ancient and modern writers have interpreted all this Punic ravaging as efforts on the part of Hannibal to coax Fabius into battle. Hannibal certainly would have welcomed the opportunity for a set battle, but the reason for these large-scale foraging operations was not merely to taunt the Romans. Hannibal still had no base and was forced to move about to keep his army fed. If his army stayed in one place too long, the area would quickly be exhausted of all its produce. Fabius understood this and was waiting for an opportunity to confine Hannibal to a small area which his army would quickly deplete. Without any supplies, the Carthaginian army would wither away. Fabius almost got his chance when he managed to trap Hannibal inside the valley of the Volturnus River while the Carthaginian army was withdrawing from Campania to establish a depot for the winter with their booty. Even if Hannibal managed to extricate his army from this trap, Fabius was hoping that the Carthaginians would, in so doing, be forced to abandon their supplies, thus compelling the Punic army to undergo another winter of privation. Hannibal, however, managed to outwit Fabius by tying torches onto the horns of his captured oxen, confusing the Romans, and succeeded in extricating both the army and the precious supplies.[105]

The final series of operations conducted during the remainder of 217 B.C. revolved around Hannibal's efforts to establish a camp with enough provisions to last his army for the upcoming winter. Accordingly, Hannibal took his army to Gereonium, which his scouts informed him was located in a region with plenty of grain. Hannibal captured the town, slew the inhabitants and proceeded to use the buildings as granaries. He then started sending out as much as two-thirds of his army to forage supplies for the winter.[106] Fabius' Master of the Horse, Minucius, decided to interfere with these activities by building a camp close to Hannibal's and sending out columns to intercept Carthaginian foraging parties. These actions proved to be effective as Hannibal was forced to concentrate his forces to meet this threat. Soon, however, his supply situation started to become critical again, and so he was forced to resume foraging. Minucius, once again, sent troops to disrupt these operations. Hannibal had to lure the Romans into a major engagement so that he might forage in peace. Hannibal's task was made easier by the fact that the Roman commanders divided their forces and refused to cooperate with one another. Hannibal eventually drew Minucius into a trap. Minucius' force was almost destroyed, but was saved by the timely

105 Polyb. 3.92.1-3.94.6; Livy 22.15.11-22.17.7; Frontin. *Str.* 1.5.28; App. *Hann.* 3.14-15; Zonaras 8.26; Plut. *Vit. Fab. Max.* 6.17.

106 Polyb. 3.100.1-8; Livy 22.23.9-10; Plut. *Vit. Fab. Max.* 8.2.

intervention of Fabius. Nevertheless, Hannibal succeeded in discouraging the Romans from further interference in his foraging operations.[107]

Historians have not been kind to Minucius. He is still portrayed as another hot-headed Roman commander who came dangerously close to disaster. On the other hand, his aggressive actions to thwart Hannibal's foraging came close to destroying Hannibal's logistical arrangements for the winter. Both Fabius and Minucius recognized Hannibal's supply problems and tried to take advantage of them to defeat him. Fabius came close to doing this when he trapped Hannibal in the Volturnus River valley. The failure of this maneuver probably convinced Minucius that more aggressive action was necessary. The historical tradition that his actions were reckless is unfair.[108] Subsequent Roman commanders would continue his policy of building their camps close to Hannibal's to restrict Carthaginian foraging parties.[109]

Once again, we have seen how logistics controlled an entire year of campaigning. Hannibal devoted almost all his operations to simply maintaining his army. With his freedom of action so restricted, it is hard to see how he could have been conducting any sort of a strategy which would result in victory. The best that Hannibal could hope for now was to wait for an opportunity for decisive action. In the meantime, he concentrated on survival.

Sometimes a series of innocuous events can lead to a momentous outcome. When Confederate General Harry Heth saw an advertisement for a shoe warehouse in Gettysburg, Pennsylvania, he sent a brigade there to fetch the needed footwear, little realizing that he was taking the first steps which would lead to the American Civil War's greatest battle. A similar, innocuous event led to the Second Punic War's greatest battle, namely, Hannibal's need for supply. Roman commanders had maintained the pressure on Hannibal's foraging activities throughout the winter. Eventually the supply situation deteriorated so badly that the Carthaginian army faced outright starvation. A continuation of the Fabian policy for another year might well have brought about this result.[110] Livy reports that when Hannibal had barely enough food left for ten days, his troops became so disgruntled that the Spanish troops planned to desert. Hannibal purportedly considered abandoning the infantry to their fate and making a dash to Gaul with the cavalry. Instead, he decided to withdraw into Apulia, where the harvests come much earlier because of the warmer climate.[111] The coming of spring brought with it a renewed campaign of foraging for the Punic army.

107 Polyb. 3.101.1-3.105.11; Livy 22.24.1-22.29.6; Plut. *Vit. Fab. Max.* 8.2-3; 10.1-12.4.

108 Georges Vallet, "Un exemple de partialité chez Tite-Live: les premiers combats autour de Gereonium (Liv., XXII, 24)," *REL* 39 (1961) 182-195.

109 Livy 22.32.1-3.

110 Livy 22.32.1-3; App. *Hann.* 3.16; Zonaras 9.1.

111 Livy 22.40.7-8, 22.43.1-6.

112 Polyb. 3.107.1-6; Livy 22.43.9-11.

Hannibal waited until the season was advanced enough for him to get supplies from the year's crops before moving out. The Carthaginians headed for Cannae because the Romans had established a supply depot there to provision their own army. Hannibal seized the town and commenced foraging for more provisions.[112] Hannibal remained in this area until the Romans brought up their own army, the largest force ever fielded against him. After some skirmishes, the Romans, once again, established two camps close to Hannibal's, to restrict his foragers on both sides of the Aufidus River.[113] Once again, this strategy was succeeding. Hannibal's supply situation, again, became critical. Even the Roman consul Aemilius noted that the Carthaginians would have to move their camp in order to obtain supplies,[114] since most of the countryside had now been stripped bare. This was to prove unnecessary as the Roman consuls decided to engage Hannibal in battle after all. The conduct and the outcome of the battle of Cannae are too well known to be recounted here.[115] Needless to say, the entire strategic situation changed dramatically. Instead of being in command of an army at the point of disintegration, Hannibal now possessed the most formidable field force in all of Italy. At the moment when his situation was most desperate, everything changed.

This brings us back to our original question, which is why did Hannibal not now seize the opportunity to capture Rome? The answer, quite simply, is that there was no way he could provision such an operation. His army, at that moment, probably did not possess enough supplies to last for a few days, much less for a three week march or a siege which could potentially take months, even years.[116] Hannibal's army was still living hand to mouth, with, as yet, no bases to draw on for supply. It is true that many Italian communities defected to the Carthaginian cause in the aftermath of Cannae. It must be remembered, however, that these events took place over a period of weeks, even months. Even if such defections had taken place instantaneously, it still would not have been possible for these communities to organize the necessary logistical support in such a short amount of time. Before Cannae, Hannibal's army was little more than a band of brigands, forced to wander the countryside in search of suste-

113 Polyb. 3.110.1-11; Livy 22.44.1-3; Plut. *Vit. Fab. Max.* 15.1-2.

114 Polyb. 3.112.2-3; App. *Hann.* 3.17-18.

115 For a discussion and bibliography on the battle see (in addition to the works listed in nn. 10 and 14), J. Kromayer and G. Veith, *Antike Schlachtfelder* I (Berlin 1912) 278-390 and F. Cornelius, "Cannae," *Klio*, Beih. 16 (Leipzig 1932). See also Hans Delbrück, "Die Schlacht bei Cannä," *HZ* 109 (1912) 481-507; Walther Judeich, "Cannae," *HZ* 136 (1927) 1-24; Martin Samuels, "The Reality of Cannae," *MGM* 47 (1990) 7-29.

116 A not unlikely timeframe when one considers the length of the subsequent Roman siege of Syracuse in 214-212 B.C.

117 Plut. *Vit. Fab. Max.*, 17.2-3.

nance.[117] In the immediate aftermath of the battle, Hannibal was still forced to carry out operations to secure provisions.[118] He went from town to town, not to make a triumphal march, but to establish control over the areas he used as a base. Hannibal even made immediate attempts to capture a seaport, so as to put himself in direct contact with Carthage. Despite all the material captured from the Romans on the battlefield, Hannibal still had to send his brother Mago home to request aid.[119] Hannibal's logistical problems had dogged him throughout his early campaigns in Italy. The victory at Cannae brought no immediate relief to these problems. It would not be until the following year that Hannibal had an established base in Italy from which to operate. Generations of writers and historians have either ignored or missed much of the ancient literary evidence concerning Hannibal's supply problems. Despite all the speculation on grand strategy, personality defects or siege equipment, Hannibal's failure to move on Rome stemmed from the least glamorous and most mundane reason of all: no food.

Conclusion

Without a permanent base of supply, Hannibal was severely restricted in his freedom of action, a fact which only one Roman general, Fabius Maximus, appreciated early in the war. Seen in this light, the foolhardiness of Roman generals who decided to take Hannibal on in pitched battle becomes even more apparent. If the Roman military leadership of 216 B.C.[120] had continued Fabius' policy of avoiding a general engagement for another year, it is possible that Hannibal's army would have totally disintegrated for want of support. In fact, both Plutarch and Livy explicitly say as much.[121] The battle of Cannae brought with it the defection of some of Rome's allies, who subsequently provided Hannibal with a base of support that enabled him to continue the war for

118 Plutarch (*Vit. Marc.* 10.1) reports that Carthaginian troops were still carrying out foraging raids in the immediate aftermath of the battle.

119 Livy 23.1, 23.11-23.13.

120 I do not subscribe to the traditional view which portrays the consul Terentius Varro as the 'hot-headed' one and Aemilius Paullus as the 'cautious' commander. Many scholars have noted Polybius' bias in favor of the Scipios and the Aemilii, as well as his blatant white-washing of their mistakes. Livy is also notorious in his contempt for any Roman historical figure with strong ties to the *populares*. The sources contain plenty of evidence that both Roman commanders were anxious to do battle with Hannibal (such as Aemilius assuming command of the Roman right flank, the position of honor, at the Battle of Cannae, Polyb. 3.114.6 and 3.116.1; Livy 22.45.8). See also Heitland, *Roman Republic* (as in n. 14) 253; Charles-Picard, *Hannibal* (as in n. 38) 178. Note also that Appian (*Hann.* 4.19) places Varro on the right and Aemilius Paullus in the center.

121 Plut. *Vit. Fab. Max.* 14.4-5, 17.1-3; Livy 22.32.2-3, 22.40.7-8.

another thirteen years. The most important of these towns, Capua, became Hannibal's chief supply base. Hannibal spent his remaining years in Italy, not only trying to preserve his base of support, but also endeavoring to secure the elusive naval base, which he accomplished with the capture of Tarentum in 212 B.C. This was the zenith of Hannibal's successes in Italy. Thereafter, his fortunes waned. The Romans continued their policy of attacking Hannibal's logistical base, greatly restricting the extent of the area in which he could operate, until he was finally bottled up in a corner of Italy. Probably more than any other war in history, Hannibal's war was a war of supply. Operating hundreds of miles from his home base, Hannibal had to devote his strategy to maintaining the existence of his army, rather than winning the war.

Hannibal's situation was not unlike that of the military commanders of the Thirty Years' War, who also maintained their armies on plunder. In his work on logistics in modern warfare, Martin van Creveld discusses the logistics of the Thirty Years' War and its impact on strategy. He argues that the whole system of supply by plunder was a disaster: army commanders were ultimately unable to feed their men and keep them under control, which led to a steady desertion rate. Armies were forced to keep on the move just to stay alive since the presence of a large force in a limited area for too long a period of time would soon exhaust all it had to offer. Even siege warfare was affected. An army commander was forced to take logistical considerations into account before conducting any siege. If the area surrounding the target city was devastated, a besieging army would not be able to sustain itself for a lengthy operation, thus making that town immune to siege warfare. Armies had to conduct their operations with a view towards maintaining themselves, rather than winning the war, a situation which made any kind of decisive strategy impossible.[122]

Hannibal's situation was not much different. Without a secure base of supply, it was impossible to conduct a strategy which could bring about a decisive conclusion. Hannibal probably did not plan on fighting in Italy for many years. Being a general of the Hellenistic age, he probably envisioned a situation in which he could defeat the Romans in a major battle which would decide the issue.[123] To accomplish this, he only needed a logistical system which would support his army for a limited period of time. Hannibal did not count on the Roman determination to continue the war despite all the military disasters. Livy's famous dictum on Cannae: "No other nation could have suffered such tremendous disasters and not been defeated"[124] could better read "Nobody but the Romans would have been too stubborn to admit defeat."

122 M. van Creveld, *Supplying War: Logistics From Wallenstein to Patton* (Cambridge 1977) 2-12.

123 B.D. Hoyos, "Hannibal, What Kind of Genius?," *G & R* 30 (1983) 176.

124 Livy 22.54.11.

Hannibal found that he was not dealing with just another Hellenistic monarchy, but the most vibrant and determined state in antiquity. In the face of such spirit, and the tremendous material resources which the Romans possessed, he could never have succeeded.

Hannibal will probably always be regarded as one of the unsuccessful great men of history. However, the analysis here shows that he will always deserve a central place in this pantheon. The material problems in taking an army hundreds of miles away from its base were overwhelming and certainly would have defeated a lesser man much sooner. In this respect he deserves to be associated with Alexander the Great, whom he greatly admired. Both Hannibal and Alexander were successful in taking armies hundreds of miles into enemy territory, something which, in antiquity, was usually not done. Few armies before or after Hannibal had to operate so far from their home base. Throughout their wars in Italy, the Romans never had to maintain armies long distances from home for extended periods of time. Greek warfare usually entailed marching over to the territory of the nearest *polis* to settle matters. The wars fought by most ancient armies were literally waged in their own backyards. Alexander and Hannibal, however, were practically marching to the ends of the earth, which is probably why they were among the most revered commanders in antiquity. Like Alexander, Hannibal possessed a *tyche* which brought him many spectacular successes. Unlike Alexander, however, Hannibal's *tyche*, in the end, deserted him.[125]

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