

## THE SIZE OF THE ARMY OF XERXES IN THE INVASION OF GREECE 480 B.C.<sup>1</sup>

1. I HAPPENED to be staying in Constantinople in the late summer of 1922 as the guest of General Sir Charles Harrington, and I was there when the Chanak crisis of that year arose. I visited the Narrows of the Dardanelles at a time when Kemal's leading troops were approaching the Asiatic coast of the Dardanelles, and there was then naturally much debate as to whether and how he would attempt to cross into Europe. It occurred to me at the time that it would be of interest to study what Xerxes had done 2402 years previously, and on returning to Constantinople I borrowed a Herodotus from the American College, and when the crisis had died down I went back with it to the Dardanelles. In that district, during the dry season, the problem of water supply looms large, and I was at once struck on reading Herodotus by the fact that this had been also Xerxes' chief difficulty, in that portion of his march which took him from the Scamander, the modern Mendere, across the Hellespont to the Hebrus, the modern Maritza.

2. With this in mind I went over that part of the route, with Herodotus and a modern map,<sup>2</sup> and I then came to the conclusion that the nature of the country put a definite limit upon the size of an army marching under such conditions as Herodotus describes. Since 1922 I have at my leisure examined the accounts of a considerable number of the authorities who have described Xerxes' invasion of Greece, from Grote to Mr. J. A. R. Munro in the *Cambridge Ancient History*, and it would appear that no one of them had either himself examined the north-eastern portion of the Gallipoli peninsula or had access to the reports of anyone who had done so. Leake confined his survey of the shores of the Hellespont to the Asiatic side, and his *Travels in Northern Greece* did not extend into the most northern portion of Thrace, while Grundy's admirable topographical descriptions of historical sites are confined to Greece. Mr. Munro and Professor Anderson explored Xerxes' route travelling northwards from Mount Athos, but appear to have ended their journey on the Hebrus.<sup>3</sup> The reason why no seeker after historical truth has been able to explore the eastern portion of the Gallipoli peninsula is, I think, that the peninsula has, until recently, been a fortified area of great importance to Turkey, and the Turk would have been disposed to regard anyone proposing

<sup>1</sup> I desire to acknowledge my indebtedness to Mr. J. A. R. Munro, Rector of Lincoln College, Oxford, for much valuable advice.

<sup>2</sup> The 250000 map revised by the General Staff, War Office, from which the attached

map has been prepared.

<sup>3</sup> Munro, 'Some Observations on the Persian Wars,' *The Journal of Hellenic Studies*, XXII, 1902, p. 294.

to make a detailed examination of the ground as a naval or military agent. Having had the good fortune to be able to examine what I regard as the part of Xerxes' route which provides the key to the problem of the size of his army, under exceptionally favourable conditions, it seems that I have a contribution to make in the solution of a problem which has vexed all the authorities who have discussed it. Almost all are agreed that Herodotus' figure of 2,100,000, exclusive of followers, for the army (Book VII. 184-85) is impossible. Grote, while confessing himself to be unable to arrive at any definite figure, considers the army to have been the greatest assembled at any epoch in history; <sup>4</sup> Rawlinson estimates the armed force at 1,190,000; <sup>5</sup> Thirwall is disposed to accept Herodotus' figures; <sup>6</sup> Curtius puts the strength of the army at 880,000; <sup>7</sup> Bury at 300,000; <sup>8</sup> Busolt accepts 300,000, including followers; <sup>9</sup> Grundy accepts half a million; <sup>10</sup> Macan computes the number of combatants at 360,000; <sup>11</sup> while Delbrück, who probably consulted some of his friends of the German General Staff and learned from them the nature of the problem of marching a large army through such country, puts the number of Xerxes' combatants at from 65,000 to 75,000.<sup>12</sup>

3. Recently Mr. J. A. R. Munro has, first of British historians, examined this question of the size of Xerxes' army from the point of view of the military requirements.<sup>13</sup> He has confined himself to conditions of organisation and command, and comes to the conclusion that the Persian army was composed of three corps, each of about 60,000 men. I had in 1922 independently arrived at a very similar figure by a different process.

4. Xerxes was engaged for from three to four years in preparing for this expedition, the main features of the preparation, besides the gathering of the army from all parts of the Persian Empire, being the digging of a canal through the promontory of Mount Athos, the construction of two bridges over the Hellespont, and the accumulation of stores of supplies at various points on the projected line of march. I am concerned only with one of these stores of supplies, that at Leuce Acte; the others are outside the region which I surveyed and have no bearing on the problem with which I am concerned. I will give my reasons for disputing the most generally accepted site of Leuce Acte when I come to discuss the features of the country through which the army marched from the bridges to Doriscus.<sup>14</sup>

5. Having completed his preparations, Xerxes made the preliminary concentration of the troops from the eastern part of his Empire at Critalla in Cappadocia and marched to Sardis, where he passed the winter, and, says Herodotus (VII. 37), he began his march thence on the first approach of spring, 480 B.C. Herodotus' mistake about the eclipse makes it difficult to fix the

<sup>4</sup> *History of Greece*, Vol. V, p. 49.

<sup>5</sup> *Herodotus*, Vol. IV, p. 129.

<sup>6</sup> *The History of Greece*, Vol. II, p. 285.

<sup>7</sup> *The History of Greece*; translated by A. W. Ward, Vol. II, p. 247.

<sup>8</sup> *The History of Greece to the death of Alexander the Great*, Vol. I, p. 287.

<sup>9</sup> *Griechische Geschichte*, Vol. II, p. 671.

<sup>10</sup> *The Great Persian War*, p. 138.

<sup>11</sup> *Herodotus: The 7th, 8th and 9th books*, Vol. II, p. 164.

<sup>12</sup> *Die Perserkriege und die Burgunderkriege*, p. 210.

<sup>13</sup> *Cambridge Ancient History*, Vol. IV, ch. 9.

<sup>14</sup> *Vide infra*, para. 17.

date of departure. Considerations of supply make it probable that in this portion of the march, as in the case of the march through Thrace and Macedonia, the army kept in touch with the fleet, and the anxiety of the Persians for the safety of their ships, evidenced by the construction of the canal through the promontory of Mount Athos, makes it also probable that the fleet did not sail until the storms of spring were passed. It seems reasonable, therefore, to date the departure from Sardis as taking place after the vernal equinox, that is, towards the end of March. The distance from Sardis to the Asiatic shore of the Hellespont by the route along the coast is approximately 280 miles, a distance which could not have been covered in less than nineteen days, allowing for one day's halt in seven, a necessity in a long march. Actually in 1922 a weak Turkish division made the march from Smyrna to the neighbourhood of Chanak in nineteen days. But a large force moves more slowly than a small one, and judging from what took place during Xerxes' marches through Northern Greece, it is probable that there was one long halt or more during the progress of the army from Sardis to the Hellespont and that this march required more than a month. This would make the arrival of the first troops on the Hellespont take place about the end of April or early in May.

6. Further, it is reasonable to suppose that Xerxes would have arranged to enter Macedonia when the wheat was ready for harvest, that is, early in July. Xerxes' reply to Artabanus in VII. 50, whether the conversation actually took place or not, suggests that this is what happened, for Xerxes is represented as saying: 'We follow then the example of our fathers in making this march; and we set forward at the best season of the year; so, when we have brought Europe under us, we shall return, without suffering from want or experiencing any other calamity. For while on the one hand we carry vast stores of provisions with us, on the other we shall have the grain of all the countries or nations we attack; and our march is not directed against a pastoral people, but against men who are tillers of the ground.'

Mr. J. A. R. Munro places the date of the battle of Thermopylae either in the third week of July or in the third week of August, and gives good reasons, with which as will be seen I agree, for preferring the later date.<sup>15</sup> If the battle of Thermopylae was fought in the third week of August it is difficult to put the advance from Doriscus before the third week in June and the arrival of the head of the army on the Hellespont before the first week in May, and, as Mr. Munro points out, it is more difficult, if the battle was fought in the third week of July, to account for the time between it and the battle of Salamis (September 23rd).

7. Herodotus' statements—

- (1) VII. 43. 'On reaching the Scamander, which was the first stream of all that they had crossed since they left Sardis, whose water

<sup>15</sup> *Vide infra*, para 49.

failed them and did not suffice to satisfy the thirst of men and cattle . . .'

- (2) VII. 58. 'Having passed through the town which is called Agora, they skirted the shores of the gulf of Melas and then crossed the river Melas, whence the gulf takes its name, the waters of which they found too scanty to supply the host.'
- (3) VII. 108. 'The next city is Stryme, which belongs to Thrace. Midway between it and Messambria flows the river Lissus,<sup>16</sup> which did not suffice to furnish water for the army, but was drunk up and failed.'

make it evident that the dry season was well advanced, and the fact that he lays stress upon the difficulties of water supply in connexion with the part of the march from the Hellespont to Doriscus seems to indicate that he had heard that they were exceptional and required special measures to deal with them.<sup>17</sup>

8. For reasons which I have given below <sup>18</sup> I do not consider that a prolonged halt by the whole or the greater part of the army on the Asiatic shore of the Hellespont to have been possible, and, even if as long as a month was spent at Doriscus in completing the organisation of the army and we fix the date of Thermopylae as early as the third week in July, the arrival on the Asiatic coast of the Hellespont could not have been earlier than in the first half of April, and was more probably some weeks later. In either case the dry season would have set in. The problem which confronted Xerxes' commanders was then to get the army from the Scamander, the last important source of water supply on the Asiatic side, to the Hebrus, the first good source of water supply on the European side. The distance from the Scamander to the Asiatic end of the bridges near Abydos is 23 miles; from thence to the Melas it is 46 miles; from the Melas to Aenos is 47 miles, and on to Doriscus 18 miles; a total distance of 134 miles, or not less than seven marches. The factors which affect the marching of troops when tactical considerations have no importance—and in this case they had none, as the whole of the country between the Scamander and the Hebrus was under Persian control—are the nature of the country and the facilities of supply, more particularly of water supply. I traversed the route in October 1922, that is, at the end of the dry season, but all the information that I could gather was to the effect that there was no material difference in the state of the rivers and streams between May and November. Thanks to the courtesy of the General Staff of the War Office I have been able to check my impressions with the information contained in a number of official reports made at various seasons of the year between the years 1905 and 1920.

<sup>16</sup> The Lissus enters the sea about 20 miles west of Doriscus and is not shewn on my map. It is only mentioned here as confirming the fact that the march took place during the dry season.

<sup>17</sup> Macan, Vol. I, Part 1, p. 32 note, mentions that there are fifteen rivers between the Hebrus and the Spercheios, not one of which is recorded to have failed.

<sup>18</sup> *Vide infra*, para 10.

9. Before dealing with these and my own observations let me quote Herodotus' description of the march and of the route taken. He says :

VII. 43. 'On reaching the Scamander, which was the first stream of all that they had crossed since they left Sardis whose waters failed them and did not satisfy the thirst of men and cattle, Xerxes ascended into the Pergamus of Priam, since he had a longing to behold the place. When he had seen everything and inquired into all particulars, he made an offering of a thousand oxen to the Trojan Athene, while the Magians poured libations to the heroes who were slain at Troy. The night after, a panic fell upon the camp, but in the morning they set off with daylight, and skirting on the left hand the towns of Rhoetium, Ophryneum and Dardanus, which borders on Abydos, on the right the Teucrians of Gergis,<sup>19</sup> reached Abydos. Arrived there, Xerxes asked to look upon all his host, so, as there was a throne of white marble upon a hill near the city, which they of Abydos had prepared beforehand by the king's bidding for his especial use, Xerxes took his seat upon it, and gazing thence upon the shore below beheld at one view all his land forces and all his ships.'

10. This account makes it easy to identify the route along the Asiatic shore of the Hellespont as I have marked it on my map. But it leaves the impression, which has been accepted by most historians, that the army halted on the Scamander together and moved forward together by one route to the neighbourhood of Abydos, where it again halted together under the king's eye. But this would have been utterly impossible even for an army of the size which I have indicated below as probable.<sup>20</sup> In August 1914 the two corps of the British Expeditionary Force, exclusive of the cavalry division, occupied an area of approximately 20 square miles in their first area of concentration, south of the fortress of Maubeuge. Owing to the fact that the motor lorries, the transshipment of which from the English ports was a long process, did not arrive until after the troops, these were placed as close together as possible, so that they could draw their supplies from the railway with their own horse transport. These two corps numbered 72,000 men and 22,000 horses, and at the battle of Mons they occupied a front of 38 miles. Making every possible allowance for the difference between a Persian host in 480 B.C. and a British army in A.D. 1914, it is, I suggest, impossible that a Persian army of 210,500<sup>21</sup> men could have been camped in an area of a few square miles and then supplied in summer-time with sufficient water, for men and animals.

11. Herodotus says (VII. 201) that on the arrival of the army opposite the pass of Thermopylae, 'King Xerxes pitched his camp in the region of Malis called Trachinia,' and Rawlinson<sup>22</sup> shows on his plan of Thermopylae

<sup>19</sup> The Teucrians of Gergis inhabited the hills between Lampsacus and the Scamander. Cf. Rawlinson, Vol. III, p. 263 note.

<sup>20</sup> *Vide infra*, para. 21.

<sup>21</sup> 150,500 combatants and 60,000 non-combatants. *Vide infra*, para. 21.

<sup>22</sup> Vol. IV, p. 202.

the camp of Xerxes as occupying a space of one square mile near Trachis, which is an absurdity. Grundy suggests that the 'Persian encampment would seem to have stretched from the river Melas or thereabouts to the entrance of the west gate of the pass,'<sup>23</sup> which would give a depth of rather more than three miles. The Persian army spent at least eight days at and in front of Thermopylae (Herodotus, VII. 201-38), and I suggest that considerations of water supply alone must have caused it to extend at least as far as the left bank of the Spercheios, some seven miles from the western exit of the pass of Thermopylae. It is necessary in studying Herodotus' account critically to remember that a large army cannot be camped round one place, that for convenience of supply it must cover a considerable area, and that the deployment for attack of a large body of troops, whether from camp or from column of route, takes a long time.

12. We must not then conceive of the Persian army as arriving together on the Scamander and as marching forward thence as one body to Abydos for the crossing. What I believe happened was that each division of the army on arriving on the Scamander halted on the river for two nights and the intervening day to fill up with water<sup>24</sup> and then advanced to the bridges. Herodotus' description (VII. 44) of Xerxes' review of his whole host from a marble throne set on a hill above Abydos is a picturesque exaggeration. What probably happened was that Xerxes watched the royal troops below him march towards the bridges, but it would, I suggest, have exhausted his patience to have seen much more than that body defile past him. It is out of the question that the whole army should have been halted together before the crossing in the country immediately round Abydos, which could not have supplied it with water even for one day.<sup>25</sup>

13. I come now to Herodotus' description of the crossing. He says (VII. 55-56):

'the foot-soldiers with the horsemen passed over by one of the bridges, that which lay towards the Euxine, while the sumpter beasts and the camp-followers passed by the other which looked on the Aegean. Foremost went the ten thousand Persians, all wearing garlands upon their heads; and after them a mixed multitude of many nations. These crossed upon the first day.

'On the next day the horsemen began the passage, and with them went the soldiers, who carried their spears with point downward, garlanded like the ten thousand; then came the sacred horses and the sacred chariot; next came Xerxes with his lancers and the thousand horse; then the rest of the army. At the same time the ships sailed over to the opposite shore. According to another account, however, which I have heard the king crossed the last.

'As soon as Xerxes had reached the European side he stood to

<sup>23</sup> p. 293.

<sup>24</sup> *Vide infra*, para. 21.

<sup>25</sup> For the amount of water required *vide infra*, para. 21.

contemplate his army as they crossed under the lash. And the crossing continued seven days and seven nights without rest or pause.' <sup>26</sup>

14. Of the forward march from the bridges Herodotus gives the following account :

VII. 58. 'So Xerxes despising the omens marched forward, and his land army accompanied him. But the fleet held an opposite course, and sailing to the mouth of the Hellespont, made its way along the shore. Thus the fleet proceeded westwards, making for Cape Sarpedon, where the orders were that it should await the coming of the troops; but the land army marched eastwards along the Chersonese, leaving on the right the tomb of Helle, the daughter of Athamas, and on the left the city of Cardia. Having passed through the town which is called Agora, they

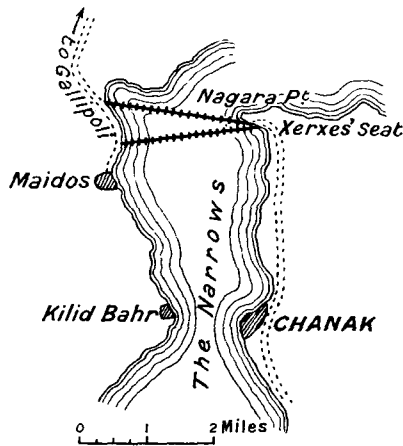


FIG. 1.—SITE OF THE TWO BRIDGES.

skirted the shores of the Gulf of Melas, and then crossed the river Melas, whence the gulf takes its name, the waters of which they found too scanty to supply the host. From this point their march was to the west, and after passing Aenos, an Aeolian settlement, and likewise Lake Stentoris, they came to Doriscus.'

15. It is not possible to fix the route eastwards along the Chersonese from this description with such certainty as that along the Asiatic coast. As to the site of the bridges there can be little doubt, for the small cove just south of Nagara lighthouse and the larger one north of Maidos are the only places immediately opposite to each other on the Narrows with easy access and exit. I have shown on Fig. 1 what I believe to be the site and arrangement of the two bridges. Herodotus estimated the width of the Hellespont opposite Abydos at 7 stades (VII. 34) about 1400 yards. According to the latest Admiralty chart this is the width at its narrowest point between Chanak and

<sup>26</sup> For further comments on this passage, *vide infra*, para. 44.

Kilid Bahr, the width at the narrowest point opposite Nagara point is 2260 yards. At these narrowest points there are no suitable landing places on the European side for two columns, one of troops, the other of transport, which was, Herodotus says, the manner of the army's march, and was, as I hope to show, an indispensable method of progress.<sup>27</sup> Therefore it seems to me that the bridges must have run from a point on the Asiatic side just south of Nagara point, the northern of the two bridges into the head of the little bay north of Maidos, the southern into the south end of that bay. At each of these points there is a good landing place. This is confirmed by the number of ships used in the bridges, 360 for the northern and 314 for the southern (VII. 36). The beam of the trireme of the period at the deck level at the waist was, according to Gaser, 18 feet. 360 vessels of this size would have been touching side by side across the narrowest part from Nagara, an impossible arrangement in the strong current of the Hellespont; and this site for the bridges would not account for the difference in the number of vessels in the two bridges. The width of the Hellespont from a point just south of Nagara into the head of the Maidos bay is 4220 yards, this distance would be filled, allowing for the landing stages, by 360 vessels of 18 feet beam with 16 feet between each ship. The distance from the same point on the Asiatic side to the southern end of the bay is 3700 yards, which would be filled by 314 vessels of 18 feet beam with 16 feet between them. My suggested site for the bridges then allows of an identical arrangement of the vessels and accounts for the difference in the number of ships employed. As Grundy points out, it is evident from VII. 36 that the two bridges were not parallel, and it would appear that the vessels of each bridge were anchored head on to the current which makes a sweep round Nagara point.

16. The European end of the bridges was, then, in the cove north of the modern Maidos, and the road ran thence for about one mile north-east at which point it forks. I have but little doubt that Xerxes' army took the southern road; for the northern road to Berghaz would have involved either a wholly unnecessary detour eastwards from Berghaz to reach Callipolis, the modern Gallipoli, or a continuance of the march by Sheitan Keui and Yeni Keui, which would have involved a steep climb up to Sheitan Keui and the use of a track up to Yeni Keui so narrow as to be impossible for a column of troops and of transport marching abreast. A further reason in favour of the southern route is that at Gallipoli there is a good supply of water from springs and wells, sufficient to-day to supply a population of about 14,000 persons, and this is the only place with any permanent water supply in summer between Maidos and Bulair. The eastern half of the Peninsula is both the most hilly and least supplied with water. The one reason why I have any hesitation in fixing definitely the southern route as that followed by Xerxes' army is that it is strange that Herodotus should not have mentioned Callipolis, if the army marched through that place, since it is now, and must always have been, the best port on the Hellespont. In spite of this the arguments in favour of the

<sup>27</sup> *Vide infra*, para. 27.



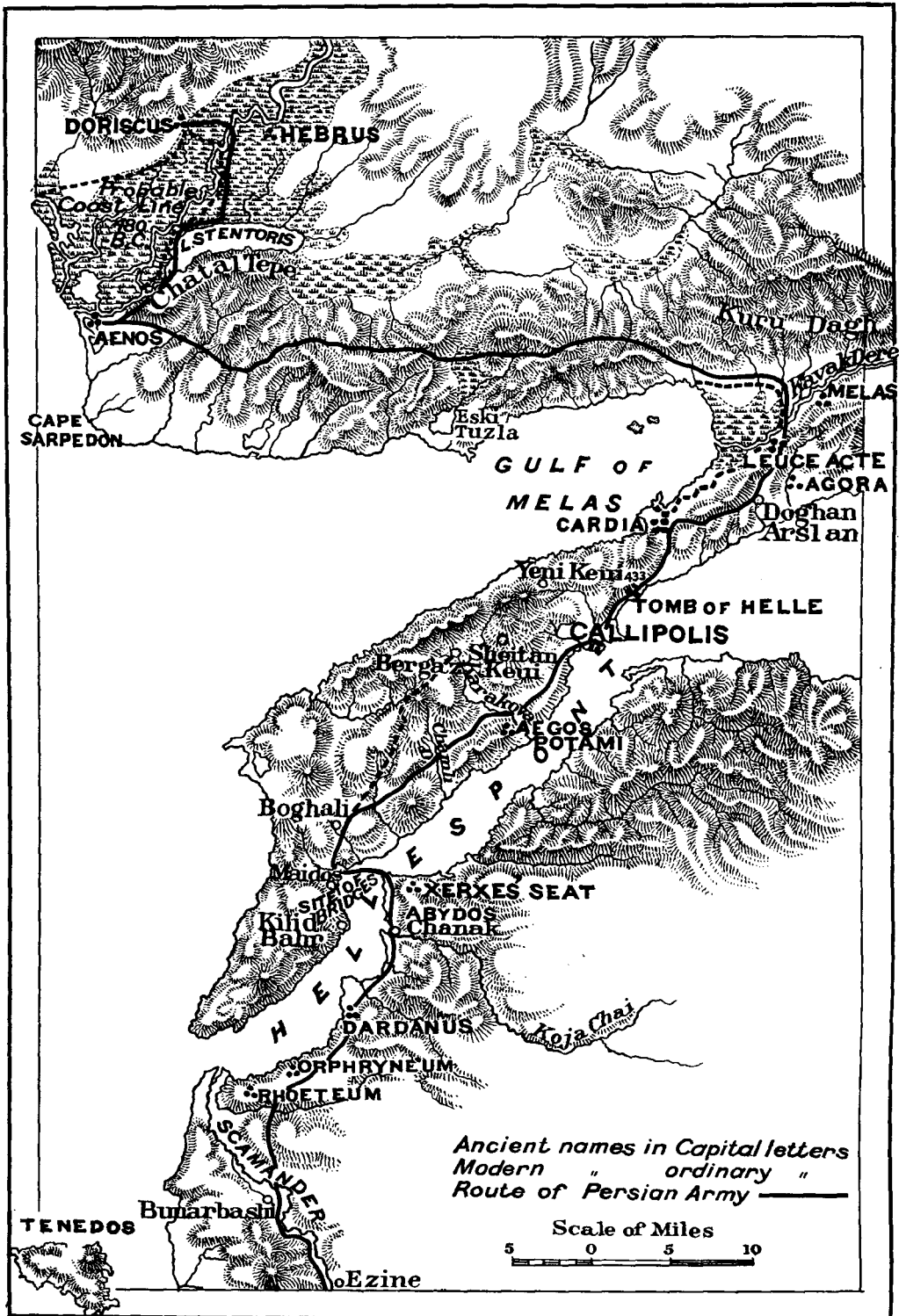


FIG. 2.—ROUTE OF THE PERSIAN ARMY.

march having passed through Callipolis appear to me to be overwhelming. The point is of secondary importance, as both roads wind through steep hills and either constitutes a military defile. North and east of Callipolis the country opens out into a slope of rough grass, with some cultivated fields, about one mile in width and three miles in length. Here it would have been possible for a considerable number of troops to spread out in bivouac, but, as I suggest below, it is not conveniently placed for a long halt.<sup>28</sup> Three miles north-east of Callipolis the road again enters a defile, and at the southern end of this defile, on the top of the hill marked 433 on the attached map, I place the tomb of Helle, which according to Herodotus the column passed on its right. There were in 1922 traces of what I took to be an ancient building on the top of this hill, and this appears to me to be a more natural site for a memorial to the God-mother of the Hellespont than that selected by Rawlinson, who places it on the hill above Pactya, the modern Daghan-Arslan.<sup>29</sup> This hill is some two miles from the coast, which here has begun to open out into the Propontis, the modern Sea of Marmora. From the top of hill 433 the ground falls cliff-like into the north-eastern end of the Hellespont, and a monument there would be visible to all ships entering or leaving the Propontis. The route of the army passed thence by Cardia (the modern Bulair), through Agora, the modern Hexamili, to the valley of the Melas. I am convinced that the present main road from Bulair to Kavak (Melas) did not and could not have existed 2000 years ago. The Melas, the modern Kavak Dere, brings down in the rainy season much silt from the hills, which has gradually pushed out the coast line on both sides at the mouth of the river, and created numerous sand-banks at its mouth. The Admiralty report of 1917 describes the eastern coast of the Gulf of Xeros as 'difficult to approach on account of shoals all the way to the Kavak river.' The ground shown in the attached map at the mouth of the Melas as marshy was in October 1922 dry and hard, though it may possibly be flooded and marshy in the rainy season. This ground is obviously alluvial, and I suggest that in 480 B.C. the coast-line was somewhat as I have indicated on my map by a dotted line, that Melas was on the coast and that the sea washed the foot of the hills just west of Agora (Hexamili). After passing Agora the line of march descended into the valley of the Melas, and this brings me to the question of the site of Leuce Acte.

17. This, Herodotus says (VII. 25), was on the Thracian coast. Grote puts it on the Hellespont,<sup>30</sup> as does Curtius.<sup>31</sup> These I take to be loose expressions for the south-western coast of the Propontis. Rawlinson,<sup>32</sup> with more precision, follows Scylax and puts Leuce Acte on the coast of the Propontis at Inje Burun not far north of Pactya (Daghan-Arslan), which is the generally accepted site. But it is clear that this or any other site on the Propontis would have been useless as a supply depot for the purpose of the Persian army. To have reached Inje Burun, from the Cardia-Melas road would have entailed a climb over a spur, 900 feet high, of the modern Tekfur Dag, and a scramble

<sup>28</sup> *Vide infra*, para. 25.

<sup>29</sup> Rawlinson, Vol. IV, p. 44, note 6.

<sup>30</sup> Vol. V, p. 19.

<sup>31</sup> Vol. II, p. 238.

<sup>32</sup> Vol. IV, p. 22.

down to the coast, which at this point is waterless in the dry season. It would be difficult to imagine a more inconvenient site for a depot. I suggest that there was more than one Leuce Acte (White Strand). White strands are not an uncommon feature either of the coast of the Propontis or of the Gulf of Melas, and strands, more especially when they were near a good water supply, were precious to the sailors of 480 B.C., who habitually hugged the coast and needed places to careen their ships. It is not improbable that the name Leuce Acte was as common amongst the sailors of the Aegean of that period as the name Hythe was amongst British sailors. There is, or was in October 1922, a very definite white strand at the mouth of the Melas, and it seems certain that such a strand existed in 480 B.C. The mouth of the Melas is just such a place as would be an admirable site for a depot of supplies for an army marching from the Scamander to the Hebrus. It is midway between the two rivers. Near such a site would be the best supply of water to be found on the route, and it would be the natural place to accumulate stores from the fertile country lying north of the Kuru Dagh and west of the Tekfur Dagh, while, if my suggestion is correct that the shoals now lying off the mouth of the river are the result of the accumulation of silt during 2000 years, there would have been in 480 B.C. no difficulty in adding to the stores drawn from the surrounding country by ship-loads of grain. I place the Leuce Acte of Herodotus, then, at or near the mouth of the Melas.

18. The line of march beyond the Melas is settled by Herodotus' mention of Aenos and Lake Stentoris (VII. 58). The only possible route from the Melas to Aenos is that through the Kuru Dagh, which I have marked. Beyond Aenos the route must have passed west of the Lake Stentoris, since the slopes of Chatal Tepe fall cliff-like into the southern shore of the lake. I suggest that, as in the case of the Melas, so in that of the Hebrus, the silt from the river has in 2000 years pushed the mouth out into the Aegean, and that the coast-line was in 480 B.C. probably as I show it on the map. The march would then have wound between the lake, the shore of the gulf and the river up to the first point of passage over the latter, near the present ferry, and thus have reached Doriscus. Doriscus was a fort built by Darius to command the passage of the Hebrus, and I suggest that it was at what was then the head of the bay near the site of modern Ferejik.

Such then are my suggestions for the route followed by the Persian army. In each case, where any modification would have been possible, I have chosen that which would have lightened the difficulties of the march.

19. Now let us survey this route through the eyes of a Persian officer charged with the arrangements for the march. The distance from the Scamander to the Hebrus is 134 miles, seven marches. The first consideration would be supply. That of food need have presented no difficulties, with a large dump of supplies at Leuce Acte at the mouth of the Melas. It would have been easy for the troops to carry three days' supply of parched grain, to fill up their bags with a further three days' supply at Leuce Acte, while the seventh day's supply could have been obtained at Doriscus, where there was a supply depot (Herodotus, VII. 25). The only food to be transported would

be that for Xerxes and his Guard and for his principal officers. The country to be traversed could supply grazing for camels and other transport animals; the horses could, like the men, have carried three days' forage and renewed their supply at Leuce Acte.

20. The problem of the water supply was far more difficult. We have had some recent experience of the water requirements of troops in hot weather and of the difficulties of meeting them. In the battle of Gaza-Beersheba, which began on October 31, 1917, Allenby's striking force for that battle, the force which was to attack Beersheba, comprised 56,000 men and 26,000 animals, and it was calculated that the minimum daily requirements in water of this force was 400,000 gallons. To provide this very elaborate preparations were made. A dam was constructed capable of holding 500,000 gallons, special arrangements were made for the transport of water by camel, the pipe-line which brought water from Egypt across the Sinai desert was extended and new wells were dug.<sup>33</sup> Even with this provision water could only be found for the force for some thirty-six hours, and the future success of the operation hung upon finding the wells of Beersheba intact, as fortunately they were.

21. The Scamander was the last large source of water supply available for the army before the Hebrus was reached, and by use of a formula, commonly used in military reconnaissance to estimate water supply, which gives sufficiently accurate results for practical purposes, I calculated that the flow of the river in October 1922 was in its lower reaches at the rate approximately of 50,000 gallons an hour. The course of this river has changed in 2000 years,<sup>34</sup> and it is possible that the supply of water in it may have changed also, though it is unlikely that the yield of the springs from which it derives should have changed much. In any event I suggest that, at any period of the dry season, the resources of the Scamander and of the adjoining springs of Bunarbashi would have been taxed to produce from 300,000 to 400,000 gallons of water a day for a number of days in succession, and to have furnished in addition sufficient water to make good by transport the deficiencies in the remainder of the route. A river, unlike a reservoir, cannot be drained to the last drop, and its water is flowing away while it is being drawn upon. Therefore not more than about one-third of its total content can be made available, without arrangement for storage, for watering an army at any given time. My calculations led me to the conclusion that it would be unsafe, after making due allowance for waste and fouling, to reckon upon the Scamander and the springs being able to supply the needs in water for an army marching from that river to the Hebrus larger than 210,000 men and 75,000 animals, and this after making a very liberal allowance for the smaller requirements of Asiatic men and animals.<sup>35</sup> The river would, I think, have sufficed for about one-fifth

<sup>33</sup> Wavel, *The Palestine Campaigns*, pp. 102-4.

<sup>34</sup> Vide Leake, *Tour in Asia Minor*, p. 290.

<sup>35</sup> On the Palestine scale the daily requirements in water of 210,000 men and 75,000 animals would be 1,300,000 gallons of

water a day. British experience on active service is that a horse requires an average of 8 gallons a day. Small Asiatic horses would need less. Camels require 10 gallons a day, and after three or four days' abstinence will drink as much as 20 gallons at one time. Vide *Animal Management*, War Office, 1908.

of this number to have halted successively on it from the afternoon of the day of arrival until the morning of the next day but one.<sup>35a</sup> This would allow time for each part of the army to organise its columns for the crossing and to fill up with water.

22. For the deficiencies of the water supply on the remainder of the route must have been serious. The first march was, I suggest, made from the left bank of the Scamander to the Koja Chai, a stream which flows into the Hellespont at the modern Chanak, just below the ancient Abydos. This stream could, if pools had been created by damming it up in places, have in the dry season provided sufficient water for the animals, but little would have been available for men, for whom some water, but a limited quantity, would have been obtainable from the springs of Abydos. From the Koja Chai below Abydos a march of 22 miles would bring the head of a column to the valley of the Karakova Dere (Aegospotami). This stream, like all the others in the peninsula, is normally bone-dry from May till late October. The rainy season supplies the peninsula with sufficient water to allow of the cultivation of the valleys and an early harvest. In most of the valleys water is obtainable by boring, but this was beyond the resources of Xerxes' army. The high lands are quite waterless, and the small scattered villages obtain their water from wells and springs, which are no more than sufficient for their needs. Only in two places, Maidos and Gallipoli, is there a good permanent supply of water during the dry season. Maidos, which lay outside the route of Xerxes' march, was the chief source of water supply to the Turkish forces opposing us in the peninsula in 1915. Gallipoli, through which I suggest that Xerxes' army passed, has springs and wells, which, as I have said, maintain a population of

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<sup>35a</sup> The Troad, unlike the Gallipoli peninsula, has been frequently explored by historians and archaeologists, and reports extending over a period of nearly 150 years are available. These confirm generally my estimates of the water supply. The most detailed and useful for my purpose is that of Dr. P. W. Forchhammer (*Geographical Journal*, 1st Series, Vol. XII, 1842), who had the advantage of having a naval survey party at his disposal. Dr. Forchhammer says, 'Only two of the rivers of the plain contain running water in the driest season of the year, that is, in the months of August and September. It may happen in a very dry season that the bed of the Mendere dries up, as seems to have been the case when it was seen by Dr. Sibthorpe in September 1794, but the inhabitants assured me that this river at all times, even in the heat of summer, has a small shallow stream of water, and that was certainly the case when I saw it in August.' A small shallow stream of water would obviously not supply water for a large army. When

I saw the Mendere in October the average width of the stream below Bunarbashi was 20 feet and the average depth 6 inches. The other river to which Dr. Forchhammer refers is the Bunarbashi Su (the Homeric Scamander), which is a narrow stream produced by the overflow of the forty springs of Bunarbashi. These springs furnish a constant supply of good drinking water. It seems to me possible that the army passed through the Mount Ida range by the pass which comes out at the modern Ezine, and that when Herodotus (VII. 42) speaks of it holding Mount Ida on the left hand, he is referring to the western part of the range, the modern Kara Dagh. The army on reaching the Mendere opposite Ezine would not have found sufficient water in the river and therefore, instead of marching straight across to Chanak (Abydos), made the detour down the valley to get below the Bunarbashi springs. These springs probably supplied most of the drinking water, while the Mendere was used mainly for watering the animals.

14,000, but there is not now, and could not have been in 480 B.C., any facilities for watering a large number of animals. On the second day's march then from the Koja Chai to the Karakova Dere there would have been no water for the army save such as it carried with it. On the third day the marching column would have passed through Gallipoli and reached with its head the neighbourhood of Cardia (Bulair), where there are some springs and wells.<sup>36</sup> The fourth day's march would have been, I suggest, a short one, of about ten miles to the Melas for the head of the column, to allow the whole of each successive column to close up and draw water and supplies. The Melas when I saw it in October 1922 consisted of a number of shallow pools connected by a narrow stream, and I suggest that it could have supplied each successive column with sufficient water for one day for men and animals, but that there would have been little to spare to carry forward. Between the Melas and Aenos, two marches, there is no water, except from a few occasional wells, either for men or animals.

23. The water arrangements for animals on the march could then have taken some such form as the following :

Animals could have been watered on the morning of the first day in the Scamander, and the evening of the first day and the morning of the second day in the Koja Chai. On the third day there would have been no water for animals at all. On the fourth day they could have been watered in the evening in the Melas, and on the morning of the fifth day before marching. On the sixth day there would have been water only for the animals at the head of the column which reached Aenos. Thereafter water difficulties cease. Such an arrangement, while entailing considerable suffering on the horses, would have been just possible.<sup>37</sup>

24. As to water for men, if the supply obtainable at Callipolis and Bulair could have been made to suffice for one day, which is possible, though doubtful, then four days' water would have had to be transported with the troops. Allowing for leakage from water-skins and evaporation, the minimum daily ration for 210,000 men could hardly have been less than two quarts per man per day, not an over-generous allowance for men marching in hot weather, whose food is dry grain. This would have entailed the transport of 420,000 gallons of water. A gallon of water weighs 10 pounds. Therefore for such a march transport would have been required for 4,200,000 lbs. weight of water. A good camel will carry 300 lbs. of water, therefore, allowing a proportion of spare camels, 15,000 camels would have been required, and these moving continuously in single file would occupy 75,000 yards of road space, or 42 miles. Allowing for the fact that the transport of food and forage had been much reduced by the preparation

<sup>36</sup> A War Office report dated February 1920 on the route from the Melas through Callipolis says of its resources: 'Water scarce—supplies nil except at Gallipoli.'

<sup>37</sup> Professor Filon, F.R.S., has made the interesting suggestion that troughs for watering horses might have been erected in the open ground about Gallipoli and in

the open ground at the northern end of the salt marsh, north of Eski Tuzla and midway between the Melas and Aenos. This is a possibility which would have overcome some of the difficulties of watering the horses, the water troughs being kept filled by convoys from the Melas.

of depots, such an accumulation of transport for the conveyance of water would have been a possibility, but no more than a possibility, and this seems to me to be another indication that the figure I have mentioned is the probable limit to the size of the Persian army which crossed from Asia into Europe. All this large store of water could come only from the Scamander and the springs of Bunarbashi, which would be a reason why the river did not suffice for the needs of the army.

25. So much then as to water supply. I come now to the nature of the road. From the European end of the bridges it winds at once through steep hills and affords just room, and no more than just room, for a double column, one of troops and one of transport. The road switchbacks up and down and would have been fatiguing for both men and transport animals. This has guided me in fixing the length of the marches, which could not, I think, have been exceeded; indeed for loaded camels in such country they are on the side of length. Until Gallipoli is reached there is no space in which a column of troops could open out to bivouac, and if, as I suggest, this open space was reached in the middle of the third march there would have been no occasion for so using it. In any case after leaving the open cultivated ground north of Gallipoli the road again enters a defile, from which it emerges into the valley of the Melas. To have closed up the columns to halt in bivouac about Gallipoli would have wasted time, since they would have had to reform in column of route to pass through the defile east of Gallipoli, and every delay would mean a further strain upon the water supply, while there are no facilities for watering a large number of animals at or near Gallipoli. Near the mouth of the Melas I have suggested was a supply depot and a fair supply of water, in short a good half-way house for a bivouac. From the valley of the Melas to Aenos the defile becomes even more pronounced, while for 13 miles beyond Aenos it is still a defile, though of a different character, for it passes first between Chatal Tepe and the Hebrus,<sup>38</sup> and then between Lake Stentoris and the river. Our Persian officer had then to consider how to march the army through a defile 110 miles long, with one suitable place for a bivouac about half-way. This march had to be made through a country insufficiently supplied with water for the needs of a large force, and the supply of water furnished by the Scamander was insufficient to provide both for the needs of the whole army during a long halt and for its needs during the march. Therefore the army had to move as quickly as possible from the Scamander to the Hebrus, where the water was plentiful.

26. It has been suggested that the building of the bridges was a magnificent gesture on the part of Xerxes intended to impress the Greeks, but by no means a necessity, since the Persian army could have been readily transported across the Hellespont in ships. But owing to the limited number of possible places of embarkation and disembarkation, such an operation would have taken far longer than marching across the bridges, while the shipment of the number of transport animals required and of the water needed would have been almost

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<sup>38</sup> Or probably, in 480 B.C., the sea.

impossible. The construction of the bridges was, in my judgment, a military necessity.

27. There are two important points in Herodotus' account of the crossing the real meaning of which has escaped the historians, because they have not examined the ground. The first is that combatant troops crossed by one bridge and the transport by another; that is to say, that from the bridges to the plain of Doriscus the army marched in two parallel columns, one composed of troops, the other of transport. This is a very unusual arrangement for a march, and it is not one which Herodotus would be likely to have invented, if there was a military reason for the arrangement. I suggest that there was. The army was about to enter a long defile very insufficiently provided with water for its needs. It was necessary, owing to the nature of the defile, for each column to halt in its march formation, except in the valley of the Melas. Therefore the easiest way in which the troops could have been supplied with water while halted was from pack animals marching parallel with them. The country was already under Persian control and no military precautions were necessary. There was, therefore, no military objection to such an arrangement. There are in the course of the defile some six places in which it would be no more than possible for a column of troops in fours and a column of pack animals in single file to move abreast, but with these narrow places to negotiate it would have been very inconvenient to bring up at the halt water carried by pack animals in the rear of the columns of troops, since troops bivouacking necessarily occupy a greater width than troops marching. Over such a road the method of having a parallel column of transport would have been much the most convenient method of supplying water, both during marches and at halts.

28. The second point has reference to the duration of the crossing. Herodotus says 'the crossing continued during seven days and seven nights without rest or pause.' Now as columns of troops and transport had to pass through a long defile in which opening out was only possible at two places, one of which, that near Gallipoli, would have been of little service, and as from each of these places the columns had again to enter a defile, it is impossible that movements across the bridges should have been continuous during seven days and seven nights. To have passed troops and transport across the bridges in that way would have produced hopeless congestion in the Gallipoli peninsula, such as would have made supply impossible, since the first troops to cross must have halted after some eight hours' marching to rest and prepare food, and each successive body must have done the same. But it does seem to me to be probable that movement across the bridges did go on for seven days and seven nights, and that Herodotus hearing of this assumed that movement was continuous.

29. To make this point clear it is necessary to devise an organisation for the 210,000 men and 75,000 animals, the probable maximum number of which the conditions of water supply admitted. I agree with Mr. Munro that the very detailed description of the army which Herodotus gives in VII. 61-87 could not have been invented and is, in fact, what we would to-day call an



order of battle. This makes it clear that the organisation of the Persian army followed generally that which all military experience has shown to be necessary for effective command. The cavalry was organised in three brigades (VII. 88); the infantry was organised in tens or sections, hundreds or companies, thousands or battalions, and ten thousands; the whole being divided into six higher commands (VII. 81–82) with the exception of the 10,000 Immortals, who corresponded to the modern Guard troops and were under the command of Hydarnes.

30. I suggest that in his account of the organisation of the infantry Herodotus had made a jump from Chilia or thousands to his Myria or ten thousands. It has been a general principle of military organisation from quite early times that in the higher commands one man cannot conveniently control more than five or six units, while it has been found extravagant of staff to give a commander less than three units to manage. This has not always applied to the lower formations, and for a long time in the British army there were eight and sometimes ten companies in a battalion, but it is asking much of one commander to give him direct control of ten battalions.<sup>39</sup> In modern armies a division is usually composed of three brigades and the divisional troops, an army corps of two or three divisions and the corps troops. It seems to me then that Herodotus, writing without any experience of the problems of military organisation, has omitted a brigade organisation and that his Myria were really brigades.

31. For the effective command of an army of such a size as I have mentioned, an organisation into six divisional commands would, I think, be a necessity; but it would, I suggest, also be a necessity that these six divisions should be divided into not less than eighteen or more than thirty brigades. Now in his catalogue of the army, Herodotus gives a number of national contingents each under an Archon, and twenty-nine of these Archontes are named. My suggestion is that the commands of the Archontes were brigades with a varying combatant strength of from 3000 to 5000 men. It seems unlikely that these tribal or national contingents conformed to any rigid establishment, and in any event there must have been considerable wastage during the long marches to the Hellespont.

32. The organisation of these twenty-nine brigades into six divisions would be in accordance with military requirements and is in accordance with Herodotus' mention of the six higher commanders in VII. 82 and VII. 121. Further, I agree with Mr. Munro and Dr. Macan that the advance from Doriscus

<sup>39</sup> I have found it difficult to believe that the legatus of the Augustan legion exercised direct command over each of his ten cohorts, of his velites, and of his auxiliaries. The Roman legion acted tactically in three lines, a relic of the division into hastati, principes and triarii, and for effective action in battle concerted action by each line was necessary. It is difficult to understand how this concerted action could

have been obtained unless each line had a commander. I am therefore disposed to think that the functions of the tribunes were normally more important than the historians indicate, and that the legatus exercised his command through three of the legion's tribunes, a commander of the light troops, and one or perhaps two prefects of auxiliaries; *i.e.* he had in battle to deal with five or six subordinate commanders.

in three columns, and the fact that there were three cavalry brigades, suggest a final organisation into three army corps each composed of a cavalry brigade and two divisions. It would be not unnatural for each of the corps to be commanded by the senior divisional general, and it may, I think, be assumed that Xerxes with his entourage and the Ten Thousand marched with the corps which moved along the coast.

33. My suggested organisation of the combatant troops then is :

3 Cavalry brigades, each 3500 strong . . . . .	10,500
6 Infantry divisions, each of four or five brigades, the approximate strength of a division being 20,000 . . . . .	120,000
The Immortals . . . . .	10,000
Xerxes' personal escort, Libyan and Indian charioteers and Arab Camelry (VII. 86), whom we may call G.H.Q. troops . . . . .	10,000

A total of 150,500 combatants.

If to this total is added 25,000 as a reasonable number of the European contingents joining the army at Doriscus (VII. 185), a figure is reached which approximates closely to Mr. Munro's 180,000, which is about as large a force of combatants as could well have been supplied during the marches through Greece.

34. Mr. Munro, being anxious to keep Herodotus' Myria, has made the ingenious suggestion that Herodotus' order of battle was, in fact, an army list of the whole Persian army of which he had obtained a sight. He argues very justly that Xerxes could not have taken the whole military power of Persia into Greece, leaving his Empire without military protection, and suggests that the Persian army was organised into six army corps and that three of these corps formed the army of invasion. I have endeavoured to fit my estimate of numbers into the scheme of organisation which Herodotus gives by halving the size of the commands of the Archontes and making those infantry brigades. Mr. Munro reaches much the same result by halving the whole army.<sup>40</sup> It is not for my purpose a matter of importance whether my conjecture or Mr. Munro's is the more correct, since we are in general agreement as to the total number of combatants.

35. It remains to account for the number of followers and the amount of transport which accompanied the fighting troops. I have suggested that some 15,000 camels would be necessary to transport water from the Scamander to the Hebrus. After the army left the Hebrus, water supply would have ceased to be a serious problem, and the animals which had been used to transport water would have been available to carry food between the depots and the supplies landed from the provision ships (VII. 184). As I have indicated,

<sup>40</sup> For an elaboration of Munro's argument in Chapter IX of the *Cambridge Ancient History* vide his paper in Vol. XXII of the *J.H.S.*, 1902, p. 294.  
J.H.S.—VOL. L. R

the establishment of a supply depot at Leuce Acte would have much reduced the amount of transport required for supplies during the march from the Scamander. But that there was additional transport is sufficiently indicated by Herodotus' account of the privileges of the Ten Thousand. He says (VII. 83), speaking, it would appear from the context, of the Ten Thousand :

'Of all the troops the Persians were equipped with the most magnificence, and they were likewise the most valiant. Besides their arms, which have been already described, they glittered all over with gold, vast quantities of which they wore about their persons. They were followed by litters, wherein rode their concubines, and by a numerous train of attendants handsomely dressed. Camels and sumpter beasts carried their provisions, apart from that of the other soldiers.'

36. If such were the privileges allowed to the royal guard, it is probable that all commanders from chiliarchs upwards had some retinue and private transport, which in the case of Xerxes himself and his princes would have been considerable. There must also have been some reserves of equipment. The length of my army of 150,000 combatants in continuous column of route would be 102 miles, and I have suggested that 43 miles of the transport column would be occupied by water transport. An allowance of 59 miles of transport for the remaining requirements of the army is not excessive. Thus the column of transport would be approximately of equal length to that of the column of troops. As this 59 miles of transport would probably have been composed of a miscellaneous collection of animals, most of them of less size than camels, we may estimate the transport requirements of the army at 35,000 animals exclusive of water transport. We have put the cavalry at 10,500, we have in addition the animals of the officers' chariots and of the chariots of the Libyans and Indians and the Arab camelry. The total number of animals accompanying the army could not then have been less than 75,000.

37. Grote<sup>41</sup> has successfully disposed of Herodotus' suggestion (VII. 180) that the number of followers was about equal to the number of the combatants, but taking into account the number of transport drivers required, officers' servants and attendants on the chiefs, it must have exceeded one-third, say 60,000. It is only possible to guess at the number of combatants who joined the army at Doriscus from Thrace, but taking rumour to have exaggerated these in the same proportion as it exaggerated the troops from Asia, then Herodotus' 300,000 (VII. 185) become 25,000. These 25,000 with, say, 8000 followers, were probably distributed amongst the commands of the Archontes from Asia, since Herodotus mentions no commanders of them by name. The army which crossed the Hellespont did not then exceed, in my judgment, 150,500 combatants, 60,000 followers and 75,000 animals, this estimate being based on considerations of supply, nor the number of combatants who marched from Doriscus to Thermopylae 175,500.

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<sup>41</sup> Vol. V, p. 40.

38. I come now to a further check upon this estimate, namely, the time required for the movement of such an army from the Scamander to the Hebrus. The problem, being as I have said to get the army from the Asiatic side of the Hellespont where water was limited to the valley of the Hebrus where it was plentiful as quickly as possible, could have been best solved in the following way:—Taking Herodotus' order of march we will assume that the Ten Thousand began to cross at 5 a.m. on the first day of crossing. If the march discipline was reasonably good, a column of 10,000 infantry, allowing for some opening out which on a rough road must have taken place and for necessary intervals after the chariots of the commanders, would be approximately six miles in length.<sup>42</sup> After about eight hours' marching it would be necessary for the head of the column to halt if only for the sake of the pack animals, which had to do seven consecutive marches preceded by a halt of only one day and two nights on the Scamander.

39. In this eight hours the head of the column starting from Koja Chai could have marched some 20 miles, that is to say, it would have reached the Karakova Dere. This in hot weather and over rough country would have been a good march. The tail of the column would then be about 14 miles<sup>43</sup> from the bridges, that is, near the Chamili Dere, and a halt for bivouac would then take place at 1 p.m. between the Chamili Dere and the Karakova Dere. I suggest that the halt for bivouac, that is, for rest and feeding of men and animals, would have required about ten hours. The Ten Thousand could then have been ready to resume the march at 11 p.m.

40. The first division of infantry, that is, another 20,000 men, could have begun marching from the Koja Chai at 5 p.m. on the first day, and at 11 p.m. the head of this would have been close on the tail of the Ten Thousand, and would have followed them without colliding for a further two hours, when it would have completed eight hours' marching and been obliged to halt for rest. The head of this column would then be at 1 a.m. on the second day on the Karakova Dere and its tail near Boghali.<sup>44</sup> Following Herodotus' order of march, the cavalry, three brigades as I suggest, could have started from the Koja Chai at 7 a.m. on the second day, and at 11 a.m. it would have reached Boghali just as the first division was resuming its march. Ten thousand cavalry occupy about the same road space as 20,000 infantry. Therefore the cavalry and each of the remaining infantry divisions would in its second march from the Scamander halt with its head on the Karakova Dere and its tail near Boghali, and each could start fourteen hours after the head of the preceding unit had begun its march.

<sup>42</sup> A pre-war brigade of British Infantry 4000 strong occupied a distance of a little more than two miles of road space. The principal armament of the Persian army was spears. Men with spears would require a greater interval between sections of fours than men with rifles; the length of the

British rifle is 3' 8½". I have, I think, then, been conservative in putting the length of the column of the 10,000 at six miles.

<sup>43</sup> The length of the column being six miles.

<sup>44</sup> Length of column twelve miles.

41. We are now in a position to draft a march table for the army as follows :

Unit.	Starting-point.	Day and hour of start.
10,000 . . . .	Koja Chai	5 a.m. 2nd day <sup>45</sup>
1st division . . . .	„	5 p.m. 2nd day
Cavalry . . . .	„	7 a.m. 3rd day
2nd division . . . .	„	9 p.m. 3rd day
3rd division . . . .	„	11 a.m. 4th day
4th division . . . .	„	1 a.m. 5th day
5th division . . . .	„	3 p.m. 5th day
6th division . . . .	„	5 a.m. 6th day

The number of what I have called G.H.Q. troops can only be guessed. Under this head I have classed Xerxes' personal escort. This would appear to have consisted of 1000 picked infantry and 1000 horse (VII. 41). To these must be added Xerxes' entourage. For it is hardly to be supposed that his chief courtiers, the priests, and the sacred chariot would have joined the transport column. I have also included in this body the Indian and Libyan charioteers and the Arab camelry (VII. 86). Chariots could only have moved slowly and at considerable intervals, and the camelry must have marched in single file. It would seem that this heterogeneous body of troops, whether it marched together or was distributed amongst the divisions, could not well have occupied less road space than two divisions. Two men in a chariot drawn by a pair of horses or wild asses (VII. 86) would, allowing the necessary intervals, occupy the same road space as 12 infantry. On this assumption the first part of the G.H.Q. troops could have begun crossing at 7 p.m. on the sixth day, the second part at 9 a.m. on the seventh day. The tail of this second part would then leave the Koja Chai at 1 p.m. on the seventh day, and at about 5 p.m. on that day would have been clear of the European end of the bridge.

42. That is to say, the crossing of a single bridge by an army of 150,000 combatants of the character of the Persian army, which after crossing had to march for seven days through a defile, would not have taken less than 132 hours. In these calculations I have allowed the Persian staff considerable experience in the arrangements of marches and for a higher standard of march discipline than the army probably possessed in 480 B.C. Since in such country checks and delays would be of frequent occurrence amongst partially trained troops, and these would have extended the time required for the marches materially beyond that which I have allowed, there would not seem to be much exaggeration in Herodotus' statement that the crossing took seven days and seven nights, even for an army one-tenth the size of that with which rumour in his day credited the Persians.

43. The fact that none of the historians who have examined Herodotus' account critically has, it would appear, himself examined the country between the site of the bridges and Aenos, nor had access to the accounts of any explorer who had done so, has caused them all to overlook the effect of the defile.

<sup>45</sup> The first day's march being that from the Scamander to the Koja Chai.

Grote is disposed to accept the statement that the crossing took seven days and seven nights as some confirmation of Herodotus' figures.<sup>46</sup> Busolt is disposed to ridicule the idea that not more than 45,000 men could have crossed in a long May day.<sup>47</sup> No one has stopped to consider what would have happened to a continuous stream of troops and transport entering the Chersonese.

It is, of course, true that 45,000 men could, by starting at dawn, have crossed the bridge by dark, if the leading troops could have opened out to bivouac when they reached the end of their marching powers; but as this was not possible, these leading troops would have had to march 26 miles through rough hilly country in hot weather. This, if barely possible for men, would have been impossible for pack transport. At the end of such a march the tail of the 45,000 would have been just clear of the bridge, and a halt of ten hours would have been necessary before the next party could start.

44. This brings me to a further point. It would seem that when the conditions of ground are appreciated, it becomes possible to reconcile apparent contradictions in Herodotus' account which have puzzled recent commentators. The description of the crossing in VII. 55 which I have quoted above<sup>48</sup> would appear, if read literally, to mean that the crossing took two days, while in VII. 56 it is said that it took seven days and seven nights. Then in VIII. 51 Herodotus says: 'Since the passage of the Hellespont and the commencement of the march upon Greece, a space of four months had gone by; one while the army made the crossing into Europe, and three while they proceeded on their march to Attica, which they entered in the Archonship of Calliades.' Munro<sup>49</sup> and Macan<sup>50</sup> both point out that the crossing is variously described as taking two days, seven days and a month, and the former suggests that perhaps the combatant troops passed in two days, the transport in seven and that the month includes a long halt about Abydos. As I have pointed out, conditions of water supply, in my judgment, preclude a long halt on the Asiatic side. Bury goes further than either Macan or Munro, and suggests that the crossing really took two days and that Herodotus added the seven days to give colour to his exaggerated estimate of the Persian host.<sup>51</sup> These three commentators all seem to me to have supposed that a much larger number of men could have made the crossing in two days than was actually possible, and to have feared that the admission of the seven days would make the army impossibly large. I have endeavoured to show that this is not so.

45. I suggest that in VII. 55-56 Herodotus, knowing that the crossing took much more than two days, wrote somewhat loosely. He begins by giving the order of march in detail for the first two days and goes on, 'then the rest of the army.' My suggestion is that these words mean that the various tribal contingents followed in the succeeding days. When I was

<sup>46</sup> Vol. V, p. 40.

<sup>47</sup> Vol. II, p. 671, note.

<sup>48</sup> Para. 13.

<sup>49</sup> *Cambridge Ancient History*, Vol. IV,

p. 270.

<sup>50</sup> Vol. I, Part 1, p. 77, note.

<sup>51</sup> Vol. I, p. 286.

discussing this passage with Mr. Munro he made the attractive suggestion that on the first two days what may be called the royal troops crossed, and that Xerxes himself followed these, standing on the European side to watch the remainder crossing under the lash. This would be in general agreement with my suggested time-table, which allows of the crossing being made by the Ten Thousand, the cavalry and the 1st and 2nd divisions during the first two days.

46. I may here mention that my examination led me to the conclusion that the use of the lash on the European side of the bridge at least for the transport animals was a military necessity. The ground here begins at once to rise steeply, and the natural tendency of pack animals on feeling the slope would be to check. A check there would have been at once repeated on the bridge, where it would have led to crowding. It has long been a military practice to take measures to avoid checks and crowding on a military bridge, as this throws a great strain on what is a temporary structure. The Persians evidently understood this and took their precautions, so there is more in Herodotus' statement than a mere holding up of Persian methods to scorn, though perhaps he did not despise the opportunity for producing that effect.

47. The reconciliation of VIII. 51 with VII. 55-56 is a more difficult matter. My suggestion is that 'the passage into Europe' was intended by Herodotus to include the march to Doriscus and the halt there, and that the first of his four months comprises the period from the completion of the crossing to the beginning of the advance from Doriscus.<sup>52</sup> There must clearly have been a long halt about Doriscus, and it seems natural to date the three months for the advance into Attica from the end of that halt. The distance from Doriscus to Athens is approximately 550 miles. Now the powers of movement of armies did not vary greatly until first railways and then mechanical transport came into general use, and we find that in 1812 Napoleon had to march a very similar distance from the Niemen to Moscow. He began the passage of the Niemen on June 23rd, and entered Moscow on September 15th. The movement then took nearly three months. The Emperor's army was larger than that which I have assigned to Xerxes, but he had more roads at his disposal, had wheeled in place of pack transport and less difficult country to traverse than had the Persians. Three months is then the time which on military grounds one would expect the march from Doriscus into Attica to have taken. Napoleon had to fight at Smolensk, Lubino and the Borodino, but these three battles did not delay him more than Xerxes was delayed at Thermopylae.<sup>53</sup>

48. On the basis of this interpretation of Herodotus' times, that is, on the assumptions that the passage of the royal troops took two days and that of the whole army approximately seven, that the period from the completion of the crossing until the beginning of the advance from Doriscus was one month, and that the march from Doriscus into Attica took three months, it is possible to prepare a project of a time-table for the whole march which

<sup>52</sup> There would appear to have been in Herodotus' mind a distinction in this passage between the actual crossing of the Hellespont and the passage into Europe.

<sup>53</sup> The main cause of the delay at Thermopylae was the time required by the Persian army to close up its long columns of march through mountainous country.

is in general agreement with Herodotus' times and also in accordance with military probabilities :—

Approximate date.	Event.
March 25th.	Army starts from Sardis immediately after the vernal equinox.
May 7th.	First troops reach the Scamander. Six weeks is not an excessive time for a march of 280 miles when there was no military reason for haste.
May 10th.	The crossing begins. The first troops would spend the 8th on the Scamander to fill up with water and organise the columns for the crossing. On May 9th they would march to the Kojia Chai.
May 12th.	Royal troops complete the crossing and that of the tribal contingents begins.
May 16th.	Last of the army crosses the Hellespont and first troops reach Doriscus.
May 22nd.	Whole army is assembled in the plain of Doriscus.
June 16th.	Advance from Doriscus begins.
July 24th.	Head of coast column reaches Therma—approximate distance from Doriscus 250 miles. A long halt takes place at Therma to gain touch with the other columns moving through more difficult country. (VII. 127.)
August 1st.	First troops leave Therma. Distance from Therma to the Malian plain approximately 140 miles. This march included a halt of several days in Pieria to clear the roads through Mt. Olympus. (VII. 131.)
August 13th.	Advanced guard enters the Malian plain and halts opposite Thermopylae. The army closes up and awaits the action of the fleet.
August 19th.	Last battle of Thermopylae.
September 12th.	Army enters Attica.
September 23rd.	Battle of Salamis.

49. One further point before I leave the march. It would seem probable that the seventh march beyond Aenos was a short one. The fifth and sixth marches from the Melas to Aenos through the Kuru Dagh must have been trying and the animals would have had no water during these marches. A short march from Aenos would have allowed the Ten Thousand, and each successive division as it arrived, to close up and bivouac between the left bank of the Hebrus and Lake Stentoris, where water would have been plentiful. But after a halt there, each successive division until the last must have marched further up the valley of the Hebrus to make room for the troops behind it. This I suggest would account for Herodotus' story (VII. 60) of the numbering in an enclosure which could just contain 10,000 men.<sup>54</sup>

<sup>54</sup> Munro, *Cambridge Ancient History*, but without reference to the ground. This suggestion does not imply that no  
Vol. IV, p. 271, makes a similar suggestion



50. It will, I hope, be clear from the above that the conditions of water supply in the Chersonese and on the coast of the Gulf of Aenos in the dry season, together with the nature of the country between the bridges and Doriscus, put a definite and ascertainable limit upon the size of an army which could have marched from the Scamander to the Hebrus in a continuous movement. A much larger army could have been assembled at Doriscus if the march from the Scamander had been made by successive divisions or army corps, moving at a sufficient interval of time to have allowed the Scamander and the Melas to have recovered from the drain upon them. But such a movement would have taken a very long time. We have seen that the last of my 150,000 men would not have reached the Hebrus until a fortnight after the first of them had left the Scamander, even if the army moved in the way which would occupy the least time. The method of march by successive corps at long intervals is therefore incompatible with the date of the battle of Thermopylae and cannot by any stretch be made to agree with Herodotus' account. It is possible that a considerably larger army could have been assembled at Doriscus if, as Macan suggests,<sup>55</sup> a part had been transported in ships and landed in the gulf of Aenos, or if a part had followed Darius' precedent and, crossing the Bosphorus, had come down to Doriscus from the north. But my examination of the story of the march from the Scamander to the Hebrus on the ground, with Herodotus in my hand, has impressed me with the fact that he must have been at great pains to examine eye-witnesses. The difficulties of the water supply, the time taken in the crossing, the use of one bridge for troops and the other for transport, the use of the lash at the European end of the bridge, and even the apparently fantastic story of the numbering, all turn out to have had some foundation and to be in accordance with what the conditions of ground make probable from the military point of view. I therefore find it hard to believe that if there had been any important movement by the army by sea or by the northern route across the Bosphorus, Herodotus would not have heard of it and told us about it.

51. Of the march from Doriscus to Thermopylae there is nothing new to be said. This route has been examined by many, and Dr. Grundy's admirable survey of the field of Thermopylae is entirely satisfactory. As to the course of the battle of Thermopylae, Mr. J. A. R. Munro has anticipated and improved upon any suggestion I had to make. His account seems to me to be in accordance both with the military probabilities and the ground.

Herodotus evidently sought to cover up the halting and ineffective action of the Greek land forces and to make of the whole story one blaze of glory. There is little doubt but that a united Greece could have successfully opposed

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numbering of the army took place. While the arrangement of the march indicates that the organisation and staff work of the Persian army were highly developed, it is not to be supposed that they had elaborated a system of regular returns of strength. The losses during the march through Asia must have been heavy and, as Professor

Filon has suggested to me, it would have been very advisable to ascertain the exact strength and to make good deficiencies from the contingents arriving from Thrace. Herodotus, VII. 100, suggests some such procedure, and that a record was made by Xerxes' scribes.

<sup>55</sup> Vol. I, Part I, p. 80, note.

any army which Xerxes could have brought against her in the range of Mount Olympus, provided that she could have prevented the Persians from obtaining the command of the sea. The real strategic reason for the abandonment of the proposal to defend Thessaly seems to me to have been, not so much the fact that there were other passes besides that of Tempe to defend, as that the Greek fleet could not oppose the Persians in the open sea.

As long as the Greek fleet could hold the strait of Artemisium an army, which Greece could well have found, could have held the Persian army indefinitely on the Callidromus range. But tribal jealousies and the fear of Persia's might prevented concerted action by the Greeks, and to those fears and jealousies Leonidas and his little band were sacrificed.

52. Given that the Persians had the military knowledge and experience to march an army of six divisions and a cavalry division some 750 miles from Sardis to Thermopylae, it is not to be credited that Xerxes should have flung his men against the narrow pass of Thermopylae in a series of hopeless frontal attacks when he had the alternative of turning the flanks of Leonidas' little force. It seems to me that he at first designed a combined naval and military operation to take the form of a military demonstration against the pass, while the fleet, sailing round Euboea, threatened Leonidas' line of retreat. Bad weather interfered with this, as it has with so many of our combined naval and military operations, and Xerxes' second plan was a military demonstration against the pass while the fleet fought its way past Artemisium. The result of this plan was the first attack on Thermopylae, and the first naval action of Artemisium, the land attack being designed merely to keep the Greeks on the spot. When the first naval action proved to be indecisive, Xerxes changed his plan to a turning movement by land. The path taken by Hydarnes and the Ten Thousand up the Callidromus must have been known to many Greeks in Xerxes' camp, and no individual traitor was needed to disclose it to him.

53. Anyone who has been over the ground must, I think, agree with Mr. Munro that the Phocians were posted well down the Callidromus covering the road to Doris. They had no outposts out and were surprised by Hydarnes, while Leonidas made the military blunder of not having a detachment on the col above him to connect his troops in the pass with the Phocians. The whole story does not speak highly of the Greek military intelligence, though their lapses are, of course, retrieved by Leonidas' gallantry. The timing of a frontal attack with a flank attack where the flanking force has to march by night over mountainous country is always a very difficult matter, and the second Persian attack on the pass seems to have been delivered too soon and to have caused the Persians some unnecessary loss. Save for this they seem to have conducted their operation intelligently, and as indeed one would expect from men who have performed the fine military feat of marching a large army through some 800 miles of difficult country. Such is, I believe, some approximation to the truth of the story of Xerxes' march from the Scamander to Thermopylae.

F. MAURICE.