

NOTES AND DISCUSSIONS

THE TIDES OF NEW CARTHAGE

Early in the campaigning season of 210 B.C., the young Publius Scipio led his army out of winter quarters north of the Ebro and marched on New Carthage, the Carthaginian base in Spain. New Carthage (modern Cartagena) was situated on a bay of the Mediterranean; a channel connected the bay with a large shallow lagoon which formerly lay to the north of the city. Scipio had been informed the previous winter by local fishermen that the water level in the lagoon usually fell toward evening. He began his assault upon New Carthage with a sustained frontal attack. Then, at the height of the battle, he detached five hundred men who were able, owing to the expected ebb of the waters, to wade through the lagoon and overrun the unguarded north wall of the city.

The phenomenon of the sinking water level in the lagoon is generally assumed to be the regular daily tidal ebb. Livy (26. 45. 8) and Polybius (10. 14. 2) both explain the receding waters as caused by the tides. But, according to *The Mediterranean Pilot* (I⁶, 68), "there are no tides in Cartagena harbour." In addition, there is the statement that the waters usually "receded every day towards evening" (Polyb. 10. 8. 7). Since successive low tides occur approximately fifty minutes later each day,¹ no ebb occurring "every day towards evening" can be properly considered a tide. We must clearly look elsewhere for an explanation of the phenomenon.

H. H. Scullard, in his excellent *Scipio Africanus: Soldier and Politician* (Ithaca, 1970), has made the most recent attempt to solve the problem: he explains the lowering of the water level as caused by winds (pp. 48 ff.). Scipio had learned that a north wind did blow occasionally, lowering the water level; but since the sinking of the waters in this case would only have been an exceptional occurrence—rather than the regular phenomenon

stressed by both Livy and Polybius—he could not count on it. But he did know that the lagoon "was shallow and in most places fordable" (Polyb. 10. 8. 7); thus he probably formed the idea of sending a detachment by that way. "Suddenly, as the sun began to decline, a squall from the north sprang up which forced the water from the lagoon to the sea." Scipio knew that such a squall was a possibility, and "in his extraordinary confidence and exultation of spirit he may even have anticipated some such external help."² In short, Scipio had planned a lagoon attack in any case; the lowering of the waters at the critical moment was merely an extra bit of luck, hoped for but not really counted on.

There are some problems in this interpretation. Scipio's letter to Philip (Polyb. 10. 9. 3) states that the regular recession of the waters in the lagoon toward evening was part of his calculations. Scullard (*op. cit.*, p. 54) quite correctly points out that "the authority of this must be final"; but he then attempts to demonstrate that the sinking of the waters was not a regular phenomenon at all, but an irregular occurrence caused by a squall. There are few places on earth where the weather is less predictable than the Mediterranean region. Could the possibility of a squall at a specific time of day really have been part of Scipio's calculations? That the lowering of the water was caused by winds, as Scullard suggests, is a virtual certainty in a region of negligible tides. But an explanation depending upon so unpredictable a phenomenon as a squall is unsatisfactory. A closer look at the climate—or, rather, "microclimate"—of the east coast of Spain suggests an alternative answer. The wind was of regular occurrence and the waters in the lagoon did indeed usually recede toward evening. The wind was in fact a phenomenon which, although usually confined to only a few miles on each side of the

1. This is due to the fact that the moon travels in its orbit in the same direction as the earth's rotation, making the period which elapses between successive occasions when the

moon is directly over a particular meridian somewhat longer than one day (i.e., about 24 hours, 50 minutes).

2. Scullard, *op. cit.*, p. 62.

shore line, is of local importance in coastal areas. It is called the sea breeze.

The Penguin *Dictionary of Geography*³ defines the sea breeze as "the diurnal movement of air from the sea to the land, caused by differential heating. During the day, the greater heating of the land causes air to ascend, and air from the sea moves in to take its place. The sea breeze . . . is thus most noticeable and most regular when temperature changes are most regular, i.e., when the *Pressure Gradient* is slight and the sky is clear; it then commences during the morning, and continues till the early evening, reaching maximum strength in the afternoon . . ." (p. 155). If we assume that there have been no major climatic changes in Spain during the last two millennia, conditions favorable for the development of the sea breeze, i.e., low pressure gradient and clear skies, would have been at their maximum at New Carthage. Modern Cartagena, in the semiarid zone bordering the subdesert, has only some fourteen rain days a year;³ clear skies, and hence rapid radiation heating of the land, are the rule. Under favorable conditions the sea breeze reaches velocities of 15–25 knots.⁴ It is a steady wind of the kind that is especially effective in piling up the shallow waters of a harbor or lagoon.⁵ With the cooling of the land toward evening it subsides,

at which time the piled-up waters are able to drain seawards. When we recall Polybius' description (10. 14. 8) of the draining of the lagoon by "a strong and deep current setting in through the channel to the neighboring sea," it is interesting to note that "sea-level extremes tend to coincide with the wind reversals, and not with the wind extremes."⁶ This fits the impression given by our sources of a detachment poised expectantly for the rather sudden draining of the lagoon.

In sum: Scipio knew in advance that the waters of the lagoon usually receded towards evening. This ebb was neither caused by the tide nor by any chance wind; it was caused by the regular, fairly dependable phenomenon of the sea breeze. But Scipio's knowledge of this ebb probably did not play a major part in his calculations.⁷ Only when his frontal attack bogged down—and always in fear of a Carthaginian army coming up to relieve the city—did he utilize this knowledge. Toward evening, when the sea breeze subsided and the waters of the lagoon drained seaward, he picked a detachment of five hundred men, and "he bade them follow Neptune as their guide on the march, and make their way straight across the lagoon to the walls" (Liv. 26. 45. 9).

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CHICAGO

3. J. M. Houston, *The Western Mediterranean World* (New York, 1967), p. 202.

4. *The Encyclopedia of Atmospheric Sciences and Astrogeology* (New York, 1967), p. 857.

5. "The strength of the current [produced by the wind] is inversely proportional to the water depth and, therefore, the piling-up effect of the wind is greater in shallow water than in deep water." A. Defant, *Physical Oceanography* (New York, 1961), II, 228.

6. P. Groen and G. W. Graves, "Surges," in *The Sea*, ed. M. N. Hill (New York, 1962), p. 616. Or, somewhat more technically: "Any force acting on the water surface of a lake or bay will cause the water surface to remain in this new position. However, when this force subsides or ceases completely, the water surface tends to resume its former state of equilibrium." Defant, *op. cit.*, p. 221.

7. Scullard, *op. cit.*, p. 53, poses two major objections to Scipio's prior knowledge of the time and nature of the ebb: (1) if he really knew of the ebb, "why did he not wait till it started before he commenced to attack?" and (2) if Scipio knew of the ebb, obviously Mago, the garrison commander, would have known as well, and hence would he "have neglected the possibility of Scipio utilizing the ebb?" In considering these objections we must remember that there were at this time three Carthaginian armies at large in Spain (Liv. 26. 42. 2). Scipio obviously could not risk anything like a prolonged siege; he had to overwhelm the garrison before one or all of the Carthaginian armies came up to relieve the

city. Once inside, with his control of the sea, he could maintain himself indefinitely. A frontal attack was his best bet; he could not base his whole campaign upon a mere stratagem. As Clausewitz (*On War*, Book 3, chap. x) has observed: "... it is dangerous to detach large forces for any length of time merely for a trick, because there is always the risk of its being done in vain, and then these forces are wanted at the decisive point. The chief actor in War is always thoroughly sensible of this sober truth, and therefore has no desire to play at tricks of agility . . . at the point where all art seems to forsake him, stratagem offers itself as a last resource." The answer to Scullard's second objection is simply that Mago, who certainly would have known the local terrain far better than Scipio, probably did not neglect the possibility of Scipio's utilizing the ebb, even though an attack across the lagoon was the least likely approach to the city by an invading army. But the most important inducement to attack New Carthage in the first place had been the fact that "the trained soldiers who garrisoned the citadel were only about a thousand in number" (Polyb. 10. 8. 4). Mago was seriously undermanned; he was compelled to use his trained soldiers in meeting the frontal attack, and hence "at many points the walls were stripped of defenders" (Liv. 26. 44. 6). Scipio's stratagem succeeded, not because Mago was unaware of its possibility, but because, since the north wall had the strongest natural defense, its defenders had "been diverted to other quarters" (Polyb. 10. 14. 14).