

An underwater photograph of an archaeological site. A diver with two blue and white scuba tanks is visible on the left, working on a large, rusted metal artifact. In the foreground, a large, orange, rusted metal object, possibly a ship's prow, is prominent. Various other artifacts, including a small red and white striped fish, are scattered around. Labels with numbers like '1119', 'P0092', and '092' are attached to some of the artifacts. The water is clear and blue.

UNDER THE MEDITERRANEAN I

Studies in Maritime Archaeology

edited by
STELLA DEMESTICHA & LUCY BLUE

WITH KALLIOPI BAIKA, CARLO BELTRAME,
DAVID BLACKMAN, DEBORAH CVIKEL, HELEN FARR
& DORIT SIVAN



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- Inset: Mandirac 1 near Narbonne France (photo: C. Durand, CNRS, UMR 7299–CCJ)
- Inset: *Ma'agan Mikhael II* before being launched in Haifa, Israel (photo: A. Efremov)

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The Harbour(s) of Ancient Torone

The search for their location and reflections on Honor Frost's hypothesis concerning shipbuilding in the area

J. Lea Beness and Tom Hillard***

Torone, towards the southwestern tip of Sithonia, Chalkidiki, remained an active port from the Early Bronze Age to the Byzantine period, often considered to have been of great strategic importance. Its economy seems to have focused on the wine and timber industries, the latter making the port of particular interest to maritime historians. This paper begins by speculating about Torone's role in the timber trade and then reviews attempts to precisely locate the city's limen, first by underwater exploration, which has revealed transformations of its coastline, and currently by the geophysical investigation of its environs, which points to the same phenomenon.

Keywords: Palaeogeography, coastal evolution, ancient harbours, ancient shipbuilding, tomography, Chalkidiki.

Land excavations at Torone on Sithonia, initiated in 1975 by the University of Sydney under the auspices of the Athens Archaeological Society and subsequently conducted by the Australian Archaeological Institute at Athens in collaboration with the Athens Archaeological Society, provide evidence for continuous occupation on the site from the Early Bronze Age to the Byzantine period. The current archaeological evidence available suggests that the coastal settlement dates from c.3000 BCE, a time marked in the Chalkidiki by a general movement from more-inland Neolithic sites towards the sea and that it quickly established itself (Morris, 2010: 3-5; and, more specifically on the dating, 14; cf. Tsigarida, 2015: 38-39). The archaeological record from that earliest period points to a community locally self-sufficient, yet with enough imports from around the Aegean to suggest that it was no modest, isolated beachhead:

As a prominent headland flanked by shores appropriate for beaching prehistoric ships [sc. Bronze Age trading vessels], just north of a large, deep protected harbour... Torone may have served a constellation of coastal sites active throughout the Aegean Bronze Age. (Morris, 2010: 5; cf. 8)

Nor, with reference to beachheads, should we think simply in terms of a Greek intrusion into Thracian lands. Kyranoudis (2015: 248) registers the toponym Toroni as

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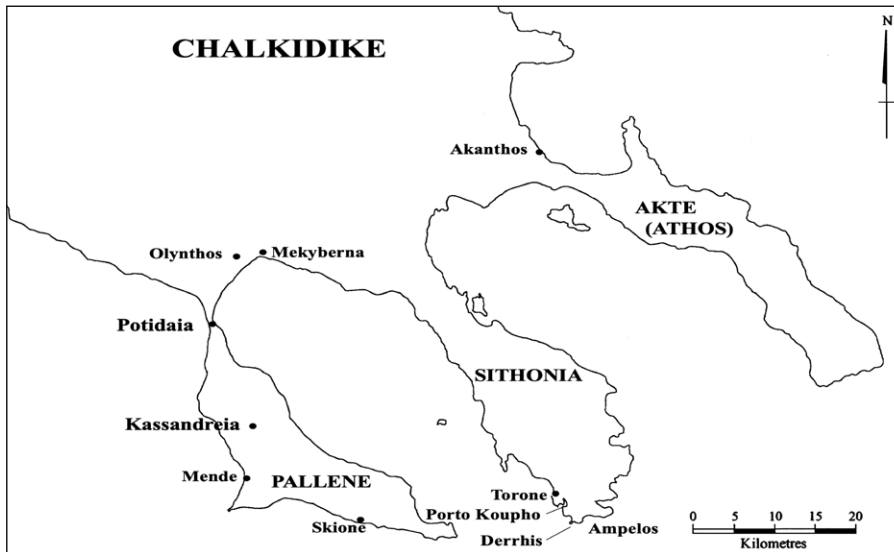


Figure 1. Map of the Chalkidiki, showing Torone towards the bottom centre (Republished, with kind permission, from *Meditarch* 28-29, 2016: 142).

‘pre-Greek’. If this is so, the mythological embroideries concerning Proteus, Herakles, and the sons of Proteus (discussed below), are Hellenic rationalizations of the name encountered. For what it is worth, the ‘*Epitome Vaticana*’ of the geographer Strabo speaks of about 30 *poleis* being peopled by Greeks (explicitly registered as Chalkidians from Euboea) ‘jointly with the Sithonians’ (Strabo, 7, frg. 11). The image of cooperation is not singular. Confrontations along the Thracian coast were often violent, but Pseudo-Skymnos speaks of colonists ‘co-habiting’ with the natives of Samothrace (he speaks of *synoikismos*; Damyanov, 2015: 300) and the current archaeological work at Argilos suggests cooperation (Perreault and Bonias, 2009). Most of those ‘cities’ on Sithonia, if we may trust the number, seem to have succumbed to local opposition – Strabo speaks of the majority of these settlements being ‘ejected’ – or from lack of competitiveness; Olynthus, at the head of the Toronaian Gulf, being the beneficiary of these expulsions and relocations.¹ Torone thrives.

Torone’s port and its trade

Almost at the southwestern tip of Sithonia, the middle prong of the Chalkidiki peninsula (Fig. 1), Torone was a flourishing trading station, the region being celebrated in the Classical era for its wine and for one of

the most valuable commodities of classical antiquity: timber. Both, it can be assumed, were at the heart of Torone’s prosperity. No specific literary evidence connects Torone to the wine trade,² but at the time of the city’s archaic and classical floruit, the amphora and the *oinochoe* (or wine jug) were emblematic of the city (Papadopoulos and Paspalas, 1999; Hardwick, 1998; cf. Killen, 2017, on *parasema* more generally). The earliest archaeological evidence for the domesticated grape at Torone comes from an early Iron Age tomb, though such domestication can be dated in the north Aegean to the Early Bronze Age (Papadopoulos, 2005: 571-572) and the town at the southern tip of Sithonia – falling within the territory of Torone – was called Ampelos (grapevine) (Herodotus, 7.122; cf. Pliny the Elder, *Natural History*, 4.10.37). ‘Mendaian’ may have served as the ‘brand name’ for wines of the region, but should not obscure Torone’s share of the market (Papadopoulos and Paspalas, 1999: 165, 178-179, 181-183; Peirce, 2001: 495-496; Papadopoulos, 2005: 572). It is timber, however, that draws our attention.

A high premium was placed particularly on shipbuilding timber. The *locus classicus* is Theophrastus, *Enquiries Concerning Plants* 4.5.5 (cf. Meiggs, 1982: 118-119). This was particularly the case given the equilibrium between a resource-rich territory and the oftentimes dominating presence of a resource-poor state like Athens (Grove and Rackham, 2001: 171-172). The ‘need’ was constant during the periods that Athens was in, or hoped to be in, the ascendant.

1 The very question of ‘colonization’ at this site by Euboean Chalkidians (to whom Strabo attributes the 30 settlements) is a hotly debated matter in modern scholarship, and one to which justice cannot be done here. For what might be called the standard view, see Tiverios, 2008: 45-49; and Zahrnt, 2015: 36. For a contrary view, Papadopoulos, 1996: 152-163, 165-174; 1997: 205; 2011: 123-124. We leave engagement with this debate until a later date.

2 Unless the text of Hippocrates, *Diseases* 2.47b.2, dealing with the therapy following pneumonia, is amended so that amongst the ingredients recommended for ingestion is ‘Toronaian’ wine (Potter, 1988: 271, n. 1; cf. Henry, 2004: 59-60).

Timber represented, along with mineral deposits, one of those resources that made the Macedonian and Thracian hinterlands of the north Aegean coast both so attractive and prosperous (Herodotus, 5.23.2, for recognition of those resources by the Persians; cf. Vasilev, 2015: 88), helping to make the north Aegean such an axis of exchange and interface (Archibald, 2013: 193-194; cf. Isaac, 1986: 41). The importance of timber in antiquity can scarcely be overestimated (Meiggs, 1982; Bissa, 2009: 111-140) and the appreciation of Macedonian and Thracian timber cannot be gainsaid (Borza, 1982: 2-8; Borza, 1987; Borza, 1990: 55-56; Bissa, 2013: 111; 112-115; 123-124; 125-127; 149-151).³ Fir was the most highly prized for triremes (Theophrastus *loc. cit.*) but was probably not present on the Sithonia peninsula, since fir is rarely found below 800 m and the highest peak in Sithonia's Itamos range is 811 m; yet pine was also used and valued for shipbuilding; and fir might, in any case, be rafted southward down the relatively sheltered Toronaian Gulf. While sparse stands of fir are found on Mt Athos, the vegetation of Sithonia is marked by a diverse mixture of pine woodlands, evergreen broadleaved species, and garrigue (or phrygana) (Panajiotidis, 2015: 306).

With regard to the importance of timber in the economic politics of the north Aegean, the evidence is cumulative; witness the Athenian angst caused by the fall of Amphipolis in the winter of 424/3 BCE – with specific reference to timber (Thucydides, 4.108.1); the treaty between Perdiccas II of Macedon, around 417-413, dealing with the supply of oars exclusively to Athens (*IG I³ 89*; cf. Borza, 1982: 7 n. 13); *IG I³ 117* (treated below) and Andocides, 2.11, boasting of Macedonian contacts; and the treaty between Amyntas III of Macedon and the Chalkidians in the 390s or 380s (Rhodes and Osborne, 2003: 12, 54-58). The north loomed large in any strategic thinking undertaken by powers to the south – in particular, of course, Athens (Borza, 1987; Faraguna, 1998: 367-368; Vasilev, 2015: 202-204, esp. n.193). Finally, we might note the Roman intervention in 167 BCE, interdicting Macedonian exploitation of timber suitable for shipbuilding (Livy, 45.29.14).

From a single evocative find, a lead letter ordering wood, dated by Alan Henry in its *editio princeps* to around 350-325 BCE, it can be speculated that trade in the latter half of the 4th century, at least, was both brisk and competitive. This rare find was made at Torone in August 1976 on the neck of the city's principal promontory (*SEG 43.488*; Henry, 1991 [1993]; 2001; 2004: 72-74

3 See also the observations of Kleigenes, the Akanthian envoy to Sparta in 383 BCE, of the abundance of ship timber in the region of Olynthos and of the revenues deriving from the many harbours and trading posts (*emporiai*) in the vicinity (Xen. *Hell.*, 5.2.16).

[T 91]; Cambitoglou and Papadopoulos, 2001: 55; Harris, 2013; Archibald, 2015: 386); it requests the urgent supply of wood (two lacunae sadly prevent the identification of species of wood being ordered) and pronounces the cancellation of the order if not satisfied within seven days. The same document appears to identify a nearby market in clear and close competition: Mende on the neighbouring peninsula of Pallene (Cassandraia). Ordered in bulk as it is, the wood was probably intended for burning (Forbes, 1996: 84-88, on timber for fuel). Attempting to draw generalizations from solitary data is clearly a risky exercise, but the item's 'accidental' status actually enhances its value.

Toronaian shipbuilders?

The suggestion that Torone prospered from timber-based commercial enterprises, involving more than simply the bulk-purchased wood that was the focus of the above transaction, must, then, as with any speculation about the wine trade, be based on inference rather than hard evidence. But the inference is attractive – not to say, *séduisante*. This raises the question of how the commodity was exported in the classical period: a matter of relevance to the harbour facilities we are seeking to uncover and one of personal interest to Honor Frost. A pseudo-Demosthenic speech (if genuine, an anti-Macedonian work now thought by many scholars to have been delivered in 331 or 330 BCE) indicates that timber was shipped to Athens over great distances ([Demosthenes] 17 'On the Treaty with Alexander' 27-28).⁴ But that was no easy matter. *Xyla naupegesima* (shipbuilding-timber) was procured 'with difficulty and from afar (*mógis kai pórrrothen [= prósothen]*)' (*loc.cit.*; cf. Bissa, 2009: 108-109). There was perhaps, when the circumstances permitted, a more economical option.

Honor Frost, at the 2nd International Symposium on Ship Construction in Antiquity held at Delphi in 1987, floated (so to speak) the argument that Macedonian shipbuilding timber, sold to the Athenians by Philip II, may have been worked by shipwrights in the Chalkidikí, and

4 The speech was once more commonly thought by those who deemed it to be a genuine speech to have been delivered in the period 336-335 BCE (Thalheim, 1905: col. 185, 18-24; cf. Bissa, 2009: 134-135). A strong argument has now placed it in the years 331-330, and related it to the abortive war initiated by Agis III of Sparta against Macedonian rule at that time (Trevett 2011: 288, and n. 10 for an alternative argument and a date of 333 BCE; Worthington, 2013: 288-289, and n. 62 and references). Even if the speech belongs, as has been argued, to the 3rd century (Trevett 2011: 287-288 and nn. 6-7, for references), the item remains relevant to the present discussion. We are grateful here for discussions with Mills McArthur and Ian Worthington.

then transported southwards virtually as ‘empty shells’. This idea was prompted by the discovery in Limani Zea, Athens, of 18 large pyramidal stone ‘anchors’, which she believed at the time to be of a volcanic stone found in northern Greece. These shells were, Frost posited (1987), shipped for finishing and equipping in Athens with the primitive anchors used on the southward voyage as ‘both emergency anchors and ballast’ before being jettisoned in Athens.⁵ This attractive hypothesis sparked a difference of opinion between her and Harry Tzalas, which in friendly contention was never resolved (even though the stones in question were probably *not* anchors and need not have originated in the north).⁶ At the very same conference, her friend David Blackman also explored the likelihood that, where circumstances permitted, shipwrights might seek to build ships near the timber sources (Blackman, 1987: 47-48; Frost, 1988: 212-214, 225); he drew upon the important evidence of *IG* 1³117, an Athenian decree, probably dating to 407/406 BCE, honouring the Macedonian king, Archelaos, for apparently allowing such building to occur in Macedon at a time of great need for the Athenians (Meiggs and Lewis, 1969: 91 [277-280]; Walbank, 1978: 90; Fornara, 2010: 161 [192-194]; Osborne and Rhodes, 2017: 188). There is general disagreement about the extent of Athenian shipbuilding activity in Macedon and outside Athens generally and a long bibliography pertaining thereto, but it makes much sense to envisage very active shipyards dotted along the north Aegean’s Thracian and Macedonian coast (cf. Garland, 1987: 97, 99, 204; Isaac, 1986: 41). Unfortunately, such facilities are likely to have left little or no archaeological trace (Blackman, 1995: 233).

Frost would have been warmed by Maria Areti Errietta Bissa’s discussion of the Telegoneian *naupagia* (Telegonian shipyards) to which allusion is made on *IG* II² 1611, 127-133, a 4th-century inscription from the Piraeus, part of a series documenting the accounts of the *epimeletai to neorion* and dating to the period 377-322 BCE (Morrison, 1995: 63-65), referring to a trireme ‘taken over half-built’

5 For *naupegia*, shipbuilding yards, in the north Aegean, see Bissa, 2009: 129; 132-135; 150.

6 We are grateful again to Mills McArthur for reminding us of the response to Frost’s paper which Harry Tzalas delivered to the 5th International Symposium on Ship Construction in Antiquity held at Nauplia in 1993, in which he argued that these pyramidal blocks were stone weights serving as mooring stones (Tzalas, 1999). Tzalas enlisted the assistance of Dr Stathis Styros of the Institute for Geological and Metallurgical Research of Athens who pronounced that the stones ‘all derive from recent geological formations common to all of Attica as well as the neighbouring island of Aegina and the volcanic region of Methana. The same stone formation is also widely found in most of the Cyclades’ (437-438). This observation in itself does not eradicate Frost’s hypothesis, even if it obviates her reason for floating the idea in the first place.

from the said *naupegia* (Bissa, 2009: 135-136). Bissa infers that the shipyards to which allusion is made were in Attica but draws attention to the fact that Telegonus was neither an Attic hero nor a name otherwise known in Attica. She points, rather, to the mythological connection with Torone. We may expand on that. Telegonus and his brother Polygonus (Tmolus in some accounts) were sons of Proteus (‘Toronaian’ Proteus in Nonnus’ *Dionysiaca* 21.289; ‘Thracian’ Proteus in Eustathius’ commentary on Dionysius Periegetes’ *Periegesis tes Oikomenes* 1.327, [C. Müller (ed.) *Geographi Graeci Minores* II (Paris, 1861), 276]), who was, in turn, in various ancient versions and *repertoria*, the husband or the father of Torone – after whom, according to various late ancient sources, the city of Torone was named (Henry, 2004: 82-88 [T 110-119]; cf. 12-13 [T 10; 13]). Telegonus and Polygonus, rationalized as local tyrants of the area in Speusippos’ *Letter to Philip*, were notorious for their deadly harassment of foreigners, before being wrestled to their deaths, at Torone, by Herakles (Henry, 2004: 84-88 [T 114; 116-119]). Bissa suggests that Torone, captured for Athens by Timotheus in 364 BCE (Diod. Sic. 15.81-6), was possibly the location of shipyards utilized by Athens in the 360s, but that, after the port was lost to Athens by 357 (Isocrates 7.9), the shipbuilders were relocated, ‘either voluntarily or not’, to Athens. For good measure, and not without effect, Bissa throws in a prosopographical argument: the possibility that the Pamphilos, one of the shipbuilding *architektones*, to whom reference is made in the above-mentioned accounts (*IG* II² 1612.156; 164; 176; and 184), can be identified with Pamphilos of Torone, buried in Athens in the first half of the 4th century BCE (*IG* II² 10454).

Alternatively, we might suggest that the reference to a ‘half-built (*hemiergon*) trireme’ be used to strengthen Frost’s earlier hypothesis.⁷

Locating the harbour

In any case, Torone prospered, a prosperity reflected in the Classical period in the significant sums drawn from the city by way of tribute to the Delian League (Henry, 2004: 41-43) and other products and resources of the area, some no doubt suitable for export (Henry, 2004: 57-63; Beness and Hillard, 2010: 89-91; Papadopoulos, 2005: 5745). The broad outline of the city’s trajectory has been traced by others, although the classic reference point, Oberhammer (1937), has been overtaken by subsequent archaeological work on the site (Cambitoglou and Papadopoulos, 2001: 37-88; Paspalas, 2007; Paspalas,

7 For a very different reading of the evidence, consult the detailed analysis of local Athenian shipbuilding by McArthur (forthcoming), arguing that this was the standard practice. We look forward to the publication of his study.

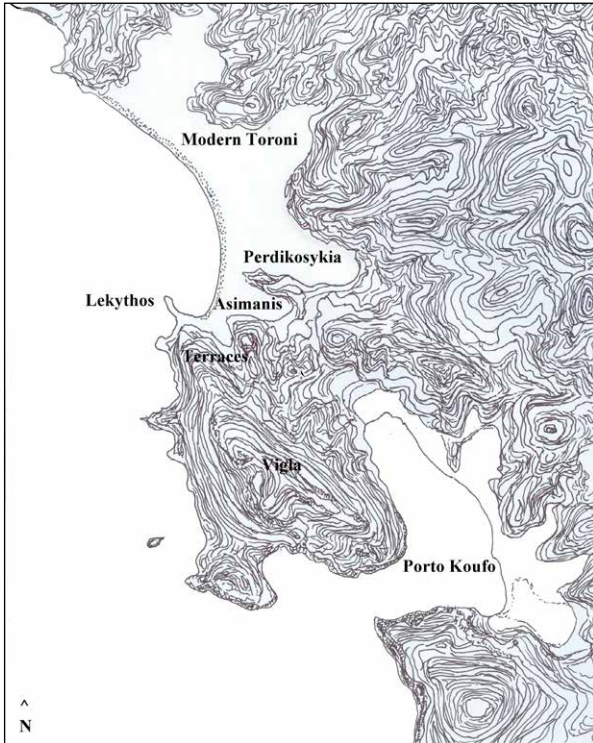


Figure 2. A sketch map of Torone's environs (based on Greek military maps 4456/2, 4456/4, 4457/1, 4457/3). The drawing is not to scale, but a sense of distance is provided by the fact that it is approximately 3 km between the Lekythos and the bay of Porto Koufo. The knoll between Perdikosykia and Asimanis is known locally as *tis kalogrias to aloni*. 'Terraces' marks the area of the classical city's extension (Map T. Hillard).

2013; and for *testimonia*, Henry, 2004). Torone was clearly one of the more substantial settlements among the 65 *poleis* listed for the Chalkidic peninsula in the Inventory of Greek *poleis* (Flensted-Jensen, 2004: 847-848 [no. 620]; cf. Archibald, 2013: 62-63). The strategic importance of the site is underlined by the multiple violent assaults that it suffered both in antiquity and in the Early Modern period. In 1659 CE, the Venetian Francisco Morosini destroyed the Ottoman fortress on its Lekythos promontory because it was 'an important place of refuge for the Turkish fleet' (Henry, 2004: 49-51), possibly referring to Porto Koufo to Torone's immediate south (Figs 2-3). The strategic importance of this north Aegean location and the attractions of that anchorage, discussed below, continued; during the Second World War, Porto Koufo served as a German U-Boat station.

Whether or not, to return to the classical period, the *polis*, in the sense of any central authority, prospered would depend on fluctuating geopolitical fortunes (see, in passing, the comments in this regard by Broodbank, 2013: 549-556), but the harbour must have been the continuous focus of public life at Torone (de Graauw, 2017: 86 [no. 1110], where it is coupled with Koufos [cf. no. 1111]; Mauro, 2017: 244-246). After the defeat of the Macedonian forces at Pydna in 168 BCE, the Romans divided Macedonia into four discrete republics. The Chalkidiki was one, and – listing its assets – Livy registers the thriving cities (*celeberrimae urbes*) of Thessalonica and Cassandrea; Pallene, a fruitful and fertile land (*fertilis et frugifera terra*); the maritime facilities (*maritimae opportunitates*) by virtue of the ports (*portus*) at Torone, Mount



Figure 3. Porto Koufo. Looking southeast from the Vigla (or 'Citadel'), 230 m. The narrow and diagonal entrance passageway to the protected anchorage can be seen at the centre of the photograph (Photo T. Hillard, 20/9/2016).

Athos, Aenea, and Acanthus, 'some of which face Thessaly and Euboia and others the Hellespont' (Liv., 45.30.4).⁸

The location of the harbour, or harbours, at Torone is therefore of some considerable importance. The Toronaïans were spoiled for choice and will have utilized more than one anchorage. Immediately to the south, approximately 2.5-3 km distant, was Porto Koufo (Figs 2-3); in terms of safe anchorage, one of Greece's best natural harbours. This roadstead was the feature that struck all modern visitors coming to the site, and a number, as well as observing the ready modern usage of the anchorage, remembered an ancient saying that unambiguously links this protected basin to ancient Torone. On October 23, 1806, the impressive Colonel Leake approached by sea, rounding the southern tip of Sithonia 'a little to the north of which is Kufó, a land-locked harbour, and then the ruins of *Torone*, still preserving the ancient name' (Leake, 1835/2005: 119). Leake had correctly taken his cue from the name of the modern hamlet of *Toroni*, then considerably more modest than the tourist destination of today, although that was not an identification universally accepted. Leake continued:

Kufó also is ancient, being the ordinary Romaic form of Kophòs (deaf), which gave rise to the Greek proverb *kophóteros tou Toronaïou liménos* [that is to say 'quieter than the harbour of the Toronaïans'], the harbour having been so called, according to Zenobius, because, separated from the outer sea by two (sic) narrow passages, the noise of the waves was not heard in it.

It should be noted that Leake further observed: 'It was perhaps the same mentioned by Thucydides as the harbour of the Colophonii', appending in a note both a reference to Thucydides 5.2 and the question: 'Ought we not to read *Kophón* instead of *Kolophonion*?' Leake was thus the first to suggest an emendation that, offered by Plugyers in 1857, is now generally accepted (Hornblower, 2004: 425-426).

The young Benjamin Meritt also approached by sea (in January 1922) and, given the difficulties of a winter-time approach, was naturally impressed by the 'comparative calm... in all weathers' of the *kophòs limén*, 'flanked on both sides by cliffs which rise perpendicularly from the water' and, within the entrance, opening out 'about a mile deep and a mile across' with 'hills gradually [sloping]

down and [giving] place to sand beaches towards the east'. This harbour, he observed,

is the only one on the peninsula which could in any modern sense of the word be designated as a harbour, and certainly there is no other which could at any time have been called *kophòs* ... even at the present day [a] safe retreat for fishermen in time of storm, and a port of call for Greek steamers plying to Sykia [on the east coast of Sithonia] when the sea is too rough to permit their anchoring in the bay of Sykia. (Meritt, 1923: 453-454)

The roadstead had long been this celebrated; see the 16th-century observations of Piri Reis (Loupis, 1999: 180; Kyranoudis, 2015: 261 n.53). Piri Reis seems to have regarded *Kophòs* as *the* harbour of the entire Sithonia peninsula (which he calls *Longos*, Sithonia's medieval and early modern name).

The proverb, turning on the tranquillity of the harbour of the Toronaïans (which survives in many sources), surely puts beyond doubt that Koufo was within the territory of Torone – and an anchorage associated with Torone (Henry, 2004: 89-92; cf. Beness *et al.*, 2010: 69-70; Kyranoudis, 2015: 260-261). Thucydides, as noted above, reports its forced reception of an Athenian fleet in 422; and an exciting archaeological survey in 2003, utilizing sidescan sonar, a submersible and ROV, has demonstrated the presence of shipping in this harbour, or, at the very least, ships perhaps seeking refuge in this bay in bad weather, in the Hellenistic and Byzantine periods (Mela, 2001-2004; cf. Theodoulou, 2015: 90; Paliompeis, 2018: 38-40; Tourtas, 2018: 231). Yet this was not the city's port in the Classical period, leaving aside the obvious observation that Koufo was secure in terms of the weather only, and far removed from the city's classical fortifications. Narrating the Athenian attack on Torone in 422 BCE, Thucydides reports, trusting the generally accepted emendation noted above, that the offensive force put into Koufo and was then divided, with ten ships 'sailing round to the city's harbour' (Thuc., 5. 2-3). This harbour must be sought to the north and closer to the city.

In between the visits of Leake and Meritt, the young Frenchman Charles Avezou arrived on horseback from the north in the spring of 1914. He was touring the whole Chalkidiki, plotting areas of archaeological interest. He had followed the picturesque but tortuous coastal track that would, in his day as in antiquity, have discouraged long-haul land-transportation of goods in any quantity in this vicinity. The entry in his day-journal for 18 May reads: 'The road follows pretty much exactly the sinuosity of the coast, strikingly cut with peninsulas, coves and marshes' (Feissel and Sève, 1979: 271). Arriving at the site on Tuesday 19 May, sometime between 8.30 and

8 Given the reference to *montem Atho Aeneamque et Acanthum*, one must suspect that the reference is to the quantity or quality of trade flowing through these ports rather than to, as would apply in the case of Torone, the naturally appointed gifts of the topography.

Figure 4. Torone's 'West Bay', showing the heavily weathered southwestern face of the Lekythos. Note the small, pebbled beach and the otherwise inhospitable shoreline. The ruins atop the Lekythos, where once stood a temple of Athena, are those of the 'Byzantine kastro' (Photo J.L. Beness, 13/10/2012).



9 am, having ridden for more than two hours, he also had no doubt that he was at the site of ancient Torone. Noting various vestiges of the ancient city, he crossed the ridge to the south and observed the beauty of Koufo, 'an extensive basin of deep water', perceived almost 'as a lake'. It was here perhaps that, from 10.30 am to 1.20 pm, he took 'rest under a fig tree, a bath and [enjoyed] an improvised lunch'. He had already noticed, however, that the 'action' was to the north. A caique was anchored off what Avezou describes as a vast sandy bay, busily loading granite 'for the pavements of Salonica' – which is to say, assiduously despoiling what was left of the ancient site (Feissel and Sève, 1979: 271). The southern point of that 'vast bay' was the logical spot to beach or weigh anchor for those wishing immediate access to the city and its remains. Large-scale 'quarrying' of the site had been in full swing in the 19th century, with hundreds of labourers employed. Memories of this despoliation remained vivid in the mid 20th century (Papangelos, 1976: 69, n.7).

Regarding Figure 2, readers will have noticed another possible location for a harbour, the small bay nestling between the two promontories that will have fallen within the city's defensive walls; that is to say, to the immediate south of the promontory marked 'Lekythos' on that map. This, however, could have served only as a fair-weather anchorage, being open to often violent weather, as evidenced by the battered southwestern face of that promontory which Thucydides called by this name: '[the] Lekythos' (Thuc. 4.113.2; Beness *et al.*, 2010, plate 2.1) (Fig. 4). It also provides, as will be seen, very limited beaching space.

It was tempting, therefore, assuming the pertinence of the current topography, which we would challenge, to locate the city's *limen* in the sheltered area to the immediate east, and in the lee of the Lekythos (Fig. 2), and this was customarily the case (Cambitoglou and Papadopoulos, 2001: 47, 67, fig. 2). Moreover, and in partial vindication of that presumption, underwater fieldwork was later to map a line of ashlar masonry that almost certainly served as docking facilities in this vicinity (Samiou *et al.*, 1995; Beness *et al.*, 2010: 71-72).

Modern explorations: underwater investigation and geophysical prospection

In 1990, Beness and Hillard conducted a reconnaissance of the underwater area just northeast of the Lekythos and discerned that aforementioned line of ashlar masonry lying 38 m offshore. In 1993, they formed a *synergasia* with colleagues, Drs Chrysiis Samiou and Nikos Lianos from the Greek Ephoreia of Underwater Antiquities, to scientifically explore this sector of the site. The exercise was conducted at that time as an adjunct exercise of the University of Sydney-based Australian Expedition to Torone (directed by Professor Alexander Cambitoglou), under the auspices of the Australian Archaeological Institute at Athens and the Athens Archaeological Society. During the first underwater field season, conducted within an all-too-short fortnight with a team of five Australians and eight Greeks, an area 100 x 50 m to the northeast of the Lekythos, and immediately to

the north of the isthmus, was laid out (with the longer, southern side of that rectangle roughly corresponding to the current shoreline) by means of 11 jackstays, each 50 m long, arranged at 10 m intervals on north-south axes. Each of those ten 10 m strips was investigated *seriatim*, first by snorkel, and then by scuba, by paired members of the team using a 10 m swimline stretched between the two bordering jackstays at each 5 m interval along the jackstays. Items of interest were drawn, while using both scuba and narghile (surface-supplied air) and mapped by means of a total station to produce both a map and a digital terrain model (Samiou *et al.*, 1995: 90-93). The overall revelation was that this area had once been terrestrial, and apparently occupied according to some rough town plan with buildings aligned to the same (distinctive) north-west, south-east orientation as found in structures earlier uncovered by the land expedition (Samiou *et al.*, 1995: 94, 99).

Most significantly for an understanding of ancient Torone's shoreline, it was possible, by mapping lines of beachrock exposed by significant alterations to the shoreline in the past, to re-draw the line of Torone's classical beachfront which had once been 1.75 m lower

than the present water level and at one point lay approximately 40 m off the current shore (Samiou *et al.*, 1995: 95-96; Beness *et al.*, 2010: 71, fig. 2; Allan, 2010: 100) (Fig. 5).

In 1994, attention was paid to structures situated along the present shoreline, confirming the findings of the earlier season. A tiled patio, approximately 2 x 2 m, was cleared, with ceramic sherds coming from immediately above the surface of the pavement dating from late (Roman) antiquity. Immediately beneath the northeast corner of this flooring, and running at an angle roughly corresponding to the present shoreline, was the base of a wall approximately 1 m wide and, given the section uncovered, at least 12 m long. The painstaking excavation by Samiou of two sondages in this difficult littoral location brought to light, from the floor-level of the building, sherds of black-glazed pottery that were sharply angular, that is to say, not at all water-worn, indicating that this locus was sealed before the rise in relative sea-level. This wall ran at an acute angle to the Hellenistic fortification wall, several courses of which are still visible along the northeastern face of the present isthmus, and every indication is that the wall, which could not be uncovered in its entirety, ran under that Hellenistic wall



Figure 5. The submerged area lying off the northeastern shore of the Lekythos photographed in 1993. The **two lines of beachrock** can clearly be seen running across the area, the inner line lying at its furthest point 20 m from the current beach; the outer, 38 m. In the distance is the plain of Asimanis, bordered on its north, at the centre-top of the photograph by the knoll tis kalogrias to aloni, and on its south by 'Hill 3' (also called Asimanis by local people) at the top right of the photograph (Photo T. Hillard).

(Cambitoglou, 1994: 143-148, plates 77b and 78; Samiou, 1999; cf. Beness *et al.*, 2010: 71-76; Beness *et al.*, 2016: 21 n. 15). In 1997, further investigation of the architectural features in proximity to the present shoreline, principally directed by Samiou and Lianos, exposed the foundations of the Hellenistic city wall. While these fortifications are currently lapped by seawater, the foundations are about 1 m below the present sea-level. Other installations currently to seaward of the present shoreline also indicate that this area was not submerged in classical, or even Late Roman antiquity.

Given the region's seismicity (Hillard, 2010), the two narrow lines of beachrock, with their discrete edges to landward (Cambitoglou, 1994: 146, under Trench V), suggest to us that two successive episodic transformations of the site provide the most likely explanation of these phenomena (Samiou *et al.*, 1995: 99-100; Beness *et al.*, 2010: 72-73). Unfortunately, these two natural features remain undated and, thus, the date(s) of these two putative events are unknown, but the vestiges of occupation prior to submersion suggest that the disturbances were post antique (Beness *et al.*, 2010: 72-73; Beness *et al.*, 2016: 21, n. 15). The conclusion was that the area left for anchorage before the seabed dropped off dramatically (Samiou *et al.*, 1995: 92-93, and figs 2-3) was not large enough to have served as a safe harbour of any great capacity. Shipping would have needed to utilize the less-protected area of Torone's extensive beach.

Given the perceived inadequacy of this area to have served as the sole location of Torone's harbour and given the distance to the inlet at Porto Koufo, our attention turned to the large floodplain lying inland of the modern beach and closest to the classical city; this is locally called Asimanis (Figs 2, 6, 7). Earlier speculation as to the location of the harbour had embraced the two floodplains to the northeast of the ancient site, currently in large part marshland. Asimanis, whether as an embayment or lagoon, was regarded as a possible location for anchorage and beaching, and so, even, was the larger plain further north, Perdikosykia (or Perdikos'kia) (see Papangelos, 1976: 90-92, for references to earlier arguments) (Fig. 2). Local memories survive that boats once enjoyed the shelter of lagoon-like conditions behind the beach and the oral tradition asserts that boat construction has once been conducted here (Vasilios Koutlianis, pers. comm. 12/10/12). Towards the southwestern corner of Asimanis and relatively close to the beach lie the ruins of a paleochristian basilica of Agios Athanasios (Fig. 6), indicating that this area at least was not under water in the 5th century CE. Hand-augering was undertaken in 1999 by Richard Dunn (Norwich University, Vermont) and a small amount of organic material extracted by that shallow coring. Seven hand-driven sediment cores were taken; unfortunately, Dunn was not able to penetrate

more deeply than 1.5 m on average and only three C¹⁴ samples could be extracted. Nevertheless, the sediment units retrieved were consistent with onetime 'shallow marine, beach, lagoon and floodplain environments', although strictly limited resources did not permit at that time a detailed analysis of the organic material retrieved. This suggested to Dunn that the area had in an earlier period, and certainly in the classical era, been a shallow marine embayment. Radiocarbon ages extracted from Dunn's core TO5 suggested to him that a restricted lagoon may have come into existence as early as c.200 CE (1820 ± 40 Yrs BP) 'and possibly earlier'. Sediments in the base of his core TO7 suggested to him that marine conditions prevailed at that core site until about that date (Beness *et al.*, 2010: 80). In 2010, Beness, Dunn and Hillard produced a series of hypothetical maps representing an impression of how and at what stages the area may have filled in (Beness *et al.*, 2010: 77-83).⁹ That hypothesis we now find open to challenge – in particular, that part of it positing that a major role was played by sand deposition transported from north to south by a dominant longshore current. Following discussions with Drs George Syrides and Konstantinos Vouvalides (Aristotle University of Thessaloniki), we are inclined to explore the possibility that the floodplains, both Asimanis and Perdikosykia to its north, were filled by deposits carried by the number of watercourses entering the plains from the mountains to the east. These are usually dry today but subject to occasional flash flooding, as seen in July 2017.

In 2015 the authors, together with Grigorios Tsokas, Panagiotis Tsourlos (Aristotle University of Thessaloniki) and Richard Jones (University of Glasgow), inaugurated a geophysical survey of the Asimanis plain by means of a 164 m-long dipole-dipole array, a line of 48 electrodes spaced at 3.5 m intervals and running on a north-south axis across Asimanis [ERT 1] close to its eastern edge, producing an electrical resistivity tomography, i.e., an approximately 150 m-long 'section' of the area (Fig. 8), with the results being presented graphically here as a 2D image of resistivity distribution at defined subsurface depths. This tomography (Fig. 9) reveals high resistivity beneath the surface (represented by the 'hot' colours) and its inverse (the 'cold' colours) and may illustrate the onetime depth of the bay, or perhaps lagoon, that is to say, the recess lying beneath the current plain. What is remarkable is that beneath the relatively hard surface of the plain, there is no indication of geological bedrock until a depth of around 20 m, perhaps suggestive of a once deep embayment, with the exception of one

9 Note that in our earlier studies we used the term *Perdikosykia* for all the floodplain(s) north of Torone. We have now, on local advice, refined the toponyms as per Figure 2.



Figure 6. The plain of Asimanis, looking north-east from the 'Anemomylos' (probably the acropolis of the classical city) from a height of approximately 90 m. To the left is the beach. In the centre of the photograph, the remains of the Basilica of Ag. Athanasios are clearly visible. The darkly greened knoll at centre right is tis kalogrias to aloni. Beyond is the floodplain of Perdikosykia (Photo J.L. Beness, 11/10/2012).



Figure 7. Torone Bay and Asimanis from the 'Anemomylos', looking northward. Asimanis is seen at the centre of the photograph. At the centre-right of the photograph, partially under an olive grove, is 'Hill 3', which may have been the 'suburb' of the classical city (proasteion) to which Thucydides (5.2) refers (Photo J.L. Beness, 11/10/2012).



Figure 8. Aerial photograph of Asimanis, Basilica of Ag. Athanasios, with the line of ERT 1 superimposed. The beach is to the right (west). (The original photograph, undated, is from the Archives of the Australian Archaeological Institute at Athens. Published by kind permission of the AAIA).

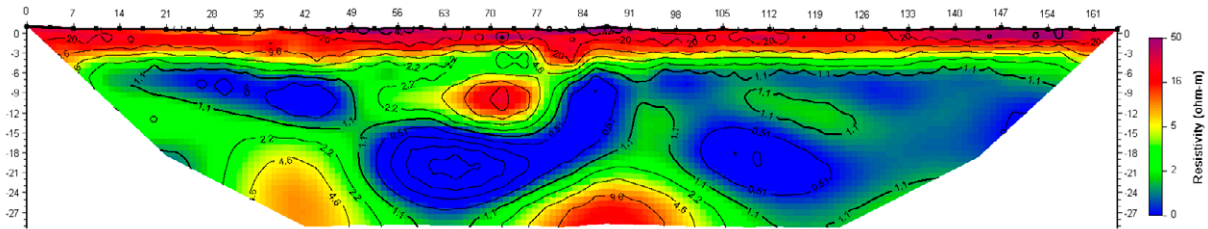


Figure 9. ERT 1. An Electrical Resistivity Section (tomography) created in 2015. The hot colours represent degrees of resistivity; the 'cold' colours represent conductivity.

'floating' anomaly (Fig. 9) that will need to be investigated in future fieldwork (Beness *et al.*, 2016).

In 2016, after clearing corridors through the marsh, a similar methodology was employed, but more comprehensively, with five more arrays laid out in Asimanis, three on a roughly east-west axis and two on a roughly north-south axis, allowing for a more (though quasi-) three-dimensional impression of the subsurface area of the plain (Fig. 10). These confirmed the picture of Asimanis' proposed depth (in its western sector), while the more easterly points, not unexpectedly, revealed a 'shallowing' of the area (Beness *et al.*, 2016). All indica-

tions thus far obtained are consistent with the existence here of an area that would have been suitable for a sheltered anchorage and, perhaps, beaching in its easternmost reaches. The knoll to the plain's north, known locally as *tis kalogrias to aloni*, formed of upright schist, provided a clear geological delineation and bordering of the area, as do the hills that are part of the archaeological site of ancient Torone to the south (Fig. 2).

Determining the chronology and nature of the plain's infilling, and whether the area is to be envisaged as having been a marine or lacustrine environment, requires deeper coring and detailed sedimentologi-



Figure 10. The ERT arrays laid out in 2016 (Republished, with kind permission, from *Meditarch*, 2016, 28-29. Mapping by G. Tsokas and P. Tsourlos, using Google Earth 2016 CNES/Astrium).

cal and micropaleontological analysis of the data thus obtained.¹⁰ This work, to be undertaken by George Syrides and Konstantinos Vouvalides, together with a similar investigation of the larger plain of Perdikos'kia to the north, which we now speculate played an important role in the evolution of Torone's northern environs, was scheduled for September 2017. Unhappily, unseasonable heavy rain on 19 July, followed by local flash flooding, prevented this exercise. It was planned that, weather having permitted, the work would be resumed in 2018. These hopes were dashed by an unusually wet period in the Chalkidiki.

10 Parallels and *comparanda* are perhaps provided by the paleoenvironmental work undertaken just to the north at the Tristinika marsh, a mere 6 km away (Panajiotidis, 2015); and the current investigation of the landscape evolution at Paroikia Bay, Paros (Karkani *et al.*, 2018) where similar methods used to explore the disappearance of a semi-enclosed lagoon are revealing what seems to be a distinctly different process and set of circumstances.

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