The EXPLORERS CLUB

Report of Expedition

FLAG # 109

VENTOTENE EXPEDITION

A MARINE ARCHEOLOGICAL SURVEY OFFSHORE
OF THE ISLANDS OF VENTOTENE & SANTO STEFANO, ITALY

2009 Season Supported

By

AURORA TRUST

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I: SUMMARY

INTRODUCTION & BACKGROUND
Explorer’s Club Flag number 109 was issued to Craig Mullen and Ian Koblick for the VENTOTENE PROJECT scheduled to take place off the coast of the Islands of Ventotene and Santo Stefano, Italy. The expedition focused on the undersea archaeological survey of the sea floor out to 150 meters in depth surrounding the Islands and the approaches to the ancient Roman harbor. The harbor, still in use, is located at the northeast end of the Island of Ventotene. It was organized in the ambit of an MOU signed between AURORA Trust and the Italian Ministry of Culture, and carried out during the summers of 2008 and 2009 in cooperation with Superintendence of Lazio, the agency of the Italian government responsible for all archaeology in the Lazio region of Italy.

II: AREA OF STUDY & EXPEDITION OBJECTIVES

VENTOTENE & SANTO STEFANO
Ventotene and Santo Stefano are two small Islands in the Eastern Tyrrhenian Sea, off the coast of Campania, Italy and form part of the Pontine Islands. Of the two Islands, Ventotene is currently the only one inhabited, its population fluctuating greatly with the short tourist season with fewer than 300 permanent residents. The island is volcanic in origin and measures approximately 3 kilometers in length and under 1 kilometer wide. Santo Stefano, a small-uninhabited adjacent Island is just 1.5 kilometers off Ventotene and is best known for the large abandoned prison that dominates its landscape.
In the Roman period, Ventotene was known as Pandataria (or Pandateria) and was best known as a place of exile for Roman women from the noble classes. Emperor Augustus exiled his wayward daughter, Julia the Elder there in 2 BC. One may still observe the remains of Julia’s opulent villa on the island. Julia spent 5 years on Ventotene, far from Rome’s social life, but she was not the last. Tiberius banished his grandniece Agrippina the elder in 29 AD; Agrippina’s youngest daughter, Julia Livilla, was also exiled to the Island on the orders of her uncle, Emperor Claudius and discreetly starved to death; and there were more to follow.

The Island today shows the remains of this early activity. One of the most extraordinary man made features on the island is the ancient Roman harbor.
Over 60,000 cubic meters of Tufa (consolidated volcanic ash) were removed to create this artificial port complex. The main basin would have been just over 3 meters deep and would have offered shelter to small and medium sized vessels in all weather conditions. The main activities of this port probably included the supply of the villas’ occupants as well as a safe haven for vessels that found themselves in distress whilst sailing in the area. A series of warehouses, moles and bollards can still be seen today.

FIGURE 2. A seventeenth century map of Ventotene showing the remains of the Roman Harbor

The ancient harbor remains in active use today as do the old storerooms carved into the hillside along the harbor, now converted to dive shops, café’s and fish mongers. Also of interest are the massive water galleries (each 5+ meters high and 20 meters long that were excavated into the center of the Island to supply the villa with fresh water. Pipes leading from the galleries have been traced to the villa, several kilometers distant, to supply its elaborate system of baths. The
The island also has a fine example of a Roman fish tank complex that would have ensured fresh seafood was available to the Island’s inhabitants.

During the Middle Ages and Early Modern periods, the island was largely uninhabited and in a state of abandon. It was also used as a pirate’s den from which Barbary pirates could attack the coast of mainland Italy. It was only in the late 18th century that the Bourbon rulers of Campania embarked on a project to build a prison on Santo Stefano coupled with a new colony on Ventotene that brought new life back to the Islands. The church, tower and other architectural features of the village that now exists overlooking the harbor date to this period.

The prison located on Santo Stefano (one of a series of Island prisons off the Italian coast) became a notorious camp that held persons who stood up to the fascist regime of Mussolini. Amongst the famous personalities who were incarcerated on Santo Stefano was Altiero Spinelli. Whilst on the Island he wrote a text, now referred to as the “Ventotene Manifesto”, which promoted the idea of a federal Europe and credited as the conceptual document espousing the concept of the modern European Union.
The islands of Ventotene and Santo Stefano rise steeply out of the surrounding seas and the seafloor shows evidence of the volcanic activity that formed the two Islands. The Islands are an extension of volcanic activity resulting from the collision of the African and European tectonic plates. Volcanism is well known in this region and extends from Sicily (Mt Etna) through the Aeolian Islands (Stromboli) and Mt Vesuvius all still active. Earthquakes resulting from movement along these adjoining plates are frequent even in modern times. The Pontine Islands, now quiet were all formed as a result of volcanism along the meeting edge of these two continental plates.

Inshore, the seafloor terrain presents a challenge to the use of towed survey instruments such as side scan sonar and sub-bottom profilers. Large mounds of
volcanic rock and rapidly changing terrain elevations make it hazardous to tow expensive and delicate instruments through the shallow areas immediately surrounding the Islands. Additionally, the water is clear and transparent and fishermen and holiday boaters would have seen shipwrecks in the shallows.

Our theory was that the trade routes leading to the port of Rome from the far reaches of the empire would have lead ancient mariners to pass closely by these Islands. With rapidly changing local weather situation caused, in part, by the presence of these high, steep sided Islands, the wind and sea conditions could have rapidly changed causing small sailing vessels to flounder out away from the Islands.

As a result, our expedition concentrated its’ efforts on water depths between 30 and 150 meters and conducted a side scan sonar survey aimed at creating a high resolution geo-referenced topographical map of the seabed which would detect and map targets within the survey area. The seafloor topography between these depths was conducive to conducting a thorough survey with sufficient overlap of adjacent survey lines so as not to “overlook” man-made targets lying on the seafloor and in among the rocks.

Figure 3a: Water Spout Over Present Day Ventotene
FIGURE 4. Hydrographic chart of the sea around Ventotene and Santo Stefano

IV: EQUIPMENT & METHODS

The expedition was equipped with the latest in seafloor survey; GPS navigation; acoustic positioning and photographic and video documentary equipment. The two support craft utilized for the expedition included the MV FORTALESA an 28 meter steel hulled vessel that served as our survey equipment storage; maintenance; data analysis and staff support facility. The second vessel, RV ISIS, a 9 meter aluminium hulled catamaran vessel, was our primary survey asset and used to gather survey data and support ROV and diver operations.

The expedition-utilized Klein side scan sonar as the primary survey tool and was equipped with sonar’s having three frequency ranges allowing us to cover the areas designated for survey very efficiently and obtain high-resolution sonar images when required. These frequency ranges were 100 kHz; 445 kHz and 900 kHz respectively with the 450 kHz and 900 kHz being the primary frequencies
used. Additionally, the expedition was equipped with a Klein K-Chirp model 3310 Sub-Bottom Profiler to determine the total depth of wreckage at the site.

Figure 5. The Klein system 3900 towed off the ISIS.

The survey data gathered was geo-referenced utilizing a GPS unit mounted on the ISIS. Geo referenced sonar data was processed by Chesapeake Technology SonarWiz.Map software facilitating survey line planning and development of real-time sonar-mosaics as the survey effort continued to generate data from the site.

The expedition was also equipped with a Saab Seaeye Falcon class ROV system rated to 330 meters. The Falcon was equipped with a high resolution sonar; LinkQuest TrackLink Acoustic High Accuracy Acoustic Tracking System allowing ROV geo-referenced data to be gathered in the survey area. The system was also equipped with a Kongsberg digital stills camera and flash and color video.
In the event our survey efforts proved successful, Dssa Annalisa Zarattini, the Superintendent responsible for underwater archaeology in the Lazio region arranged to provide a team of tri-mix Italian divers supported by a Carpentaria dive team to obtain high quality video images of the site.

The dive team was to work from a support boat manned by the Carpentaria. The AURORA team would provide secondary support and assist in marking the location of each wreck site based upon the sonar survey and ROV inspection position data. A marker buoy with a shot-line to a small anchor was used to direct the divers to each wreck site.

A complete list of equipment utilized for the expedition is attached as annex A.
V: SURVEY OPERATIONS AND RESULTS

Plan Of Operations

PHASE I – SIDE SCAN SONAR REMOTE SENSING
The first phase of the 2009 campaign was to complete the side scan sonar survey begun in 2008. It was critical to insure complete coverage of the study area was obtained and completing the area remaining uncovered from the 2008 campaign provided the complete archaeological map of the study area. Possible objects of interest were to be noted and marked for further study.

The 900 kHz would then be deployed on selected targets of interest to assist in determining their possible manmade or natural origin. The 900 kHz sonar with its’ comparative high-resolution capability is an effective target discriminator. The 900 kHz has a relatively short range and navigation and positioning will be critical.
**PHASE II – ROV VIDEO & DIGITAL STILLS**

This effort would consist of the visual verification and recording (photography and video) of anomalies detected during the remote sensing surveys. Anomalies are defined as possible man-made objects on the seafloor. The Falcon ROV would be the primary tool to be used in the initial visual verification of items of interest in the survey area. Equipped with a high quality digital stills camera and color video camera the ROV could remain on the sea floor for hours at a time without having to resurface for battery recharge or crew change. The weather would need to be calm for this type of operations.
PHASE III – **MANNED DEEP DIVING**

The AURORA team would include a deep Tri-mix manned diving operation aimed at obtaining high-resolution video images of three sites. Utilizing the video and stills provided by the ROV, the AURORA team would help prioritize the limited bottom time available to the divers at the 100 -120 meter depths where the shipwrecks were located. Additionally, since the ROV’s position is geo-referenced through its acoustic tracking system, the AURORA team will put the divers right on the target to maximize their productivity and bottom time.
PHASE IV – **Artifact Recovery**

This phase was set aside for the deployment of highly experienced tri-mix deep diving videographers with the secondary potential of artifact recovery.

VI: ON-SITE OPERATIONS

A: Seafloor Survey

In order to achieve the expedition’s objectives, the Trust initially deployed the Klein System 3900 side scan sonar from the MV ISIS set to operate at 445 kHz. The sonar fish was towed along a series of predetermined lines that were laid out in a triangular form around the islands. They were spaced such that the sonar traces overlapped on each line. This ensured the methodical coverage of the area earmarked for survey. Care was given to ensure no gaps in the coverage of the seafloor around both Islands. In general the area was completely covered with the side scan sonar set at 445 kHz. This gave us a reasonable range for efficient area coverage, but with sufficient resolution to detect targets of interest.

At the conclusion of the lower-resolution survey the sonar was set to the higher 900 kHz frequency and deployed on selected targets of interest to determine their possible manmade vs. naturally occurring origin. The 900 kHz sonar with its’ comparatively high-resolution capability would be an effective target discriminator in this application.

B: Discoveries & Results

1: PHASE I: **Remote Sensing Operations Results**

Following the promising results obtained in 2008 (three potential ancient shipwrecks) the remaining survey area provided a further two targets worthy of further investigation. The completed sonar mosaic around the Islands revealed 5 probable shipwrecks, heretofore unknown, scattered around the seafloor.
Figure 10: Completed Sonar Mosaic Around Ventotene And Santo Stefano

Roman Amphorae Wreck

Mortaria Wreck

Figures 11 and 12: 900 kHz Sonar Images Of Two Ventotene Shipwrecks
2: PHASE II: ROV VIDEO AND DIGITAL STILLS RESULTS

The ROV was deployed to verify the five targets highlighted as 'high priority. All five targets turned out to be ancient shipwrecks dating back to various phases of the Roman period:

![Image of ROV underwater with shipwreck]

Figure 13: The ROV Documents A Roman Amphorae Wreck Off Ventotene

**SITE 1:** A very well preserved shipwreck with cargo of mixed Spanish amphorae from Baetica carrying garum (Roman fish sauce) measuring approximately 15 metres long by 5 metres wide. The height of the amphorae, many if which are still stacked in their original position, is just over two metres. Date: circa 1st Century AD.
**SITE 2**: A very well preserved shipwreck with cargo of Italian wine amphorae (from Campania) measuring approximately 18 metres long and 5 metres wide. The height of the amphorae, many if which are still stacked in their original position, is just over two metres. Date: circa 1st century BC.

**SITE 3**: Shipwreck with mixed cargo of mortaria (mortars) and Italian wine amphorae (from Campania) measuring approximately 13 metres long and 4 metres wide. The height of the mortaria pile is approximately one metre. Some amphorae can be observed emerging from under the pile of mortaria.

![Figure 14: The Mortaria Wreck At 110 Meters Off Ventotene](image)

Although divided into two pieces, this site is very well preserved. Date: circa 1st century AD.

**Site 4**: Shipwreck with mixed cargo of Italian wine amphorae, glass frit, metal bars and as yet unidentified cylindrical objects. This site measures approximately 20 metres long and 5 metres wide and is relatively flat (not
more that 50 cm off the seabed). Although not as complete as the first three sites the objects from this shipwreck are relatively well preserved. Date: circa 1st century AD.

**Site 5:** A very well preserved shipwreck with a cargo of North African amphorae (carrying garum) measuring approximately 12 metres long and 4 metres wide. The height of the amphorae, many if which are still stacked in their original position, is just over two metres. Date: circa 5th century AD.

3: PHASE III: **MANNED DEEP WATER DIVES**

We used the ROV’s video data to select three of the five sites for deep-sea manned diving operations aimed at obtaining high-resolution video images.

![Diver With ROV Inspect Roman Era Amphorae Wreck](image.jpg)

Figure 15: Diver With ROV Inspect Roman Era Amphorae Wreck

A highly experienced, award winning Italian underwater photographer, Roberto Rinaldi, worked with the AURORA Trust and the Ministero dei beni Culturali and
was assisted by dive expert Marco Donato to obtain spectacular video of three of the sites.

4: PHASE IV: RECOVERY RESULTS
In order to better understand the newly discovered sites it was decided to recover a representative sample of objects from two of the shipwrecks.

Figure 16: Diver Prepares An Amphora For Recovery To The Surface
In a delicate, well-planned operation supported by a fantastic team of Carabinieri divers, four mortaria were recovered from site 3 and one amphora from site 1. These were transferred to the museum of Ventotene where they will be desalinated, restored and eventually displayed.

![Figure 17: A Mortaria Reaches The Surface After A 2,200-Year Delay](image)

**VII: CONCLUSIONS**

Ventotene and Santo Stefano appear to be in or near the active sea-lanes used by ancient mariners during Roman times and most likely carrying cargos to Rome from various parts of the empire. The shipwrecks discovered during two seasons working off the Islands appear to be of average size for the period though far from the larger sizes known to exist during this time. None of them appear to have been carrying cargo to Ventotene itself.

All shipwrecks discovered were inside the 150-meter depth contour at an average depth of about 110 -120 meters. We did not actively search inside the
30-meter contour or outside the 150-meter depths. Considering the volume of traffic passing by this area during Roman times other wrecks most likely exist in deeper waters off the Islands. Similar wrecks have been discovered in the very deep waters (3,000 meters) of the Tyrrhenian Sea.

No wrecks discovered during our investigations were older than approximately 200BC or newer than approximately 200AD based upon a review of the amphorae onboard. It is interesting to note that no wrecks younger than approximately 200AD have been discovered in the search area.

The Islands (particularly Ventotene which is orientated ENE - WSW) could have been used to shelter the mariner during sudden changes in the weather by providing a lee from strong northerly or southerly winds due to their height.

The Island could have also contributed to the sinking’s by altering local weather patterns and catching the mariner by surprise as he sailed out from behind a lee created by the steeply sided Island. Considering the sail arrangement of the cargo vessels of the day, a mariner, with his large single square sail up could have encountered a sudden, capsizing gust as he sailed from behind the lee provided by the Island.

Three of the five wrecks discovered appear to have gone down intact as they were in one piece on the seafloor. The other two were found in two pieces, however they may have broken up at the surface due to the way the cargo was stowed, before they ultimately sank. It’s not clear that any of the wrecks were a result of making contact with the shore, before drifting out and sinking in deeper water.

**VIII: WORK REMAINING**

The Trust is planning to return to Ventotene during the summer of 2010. It is envisaged that a sub bottom profiler will be deployed over the 5 shipwrecks so as
to determine the extent of the site buried in under the sediment. Furthermore, the ROV will be deployed to carry out more photographic recording of the sites and if deemed necessary samples of objects from other sites will be recovered. As the site has attracted world attention, it is possible a documentary film will be made to facilitate a wider appreciation of the site and its place in world history.

For more photos of expedition click here:
APPENDIX

1: EXPEDITION MEMBERS:

CRAIG MULLEN:
Expedition Co-Leader – Field Survey & Documentary Operations

IAN KOBLECK:
Expedition Co-Leader – Field Support – Survey & Support Craft Operations

DR. TIMMY GAMBIN:
Director of Archaeology – AURORA Trust

DSSA ANNILISA ZARINTINI
Superintendent, Marine Archaeology, Lazio Region, Italy

ERIC MULLEN:
Chief ROV Pilot

ROBERTO RINALDI:
Tri-Mix diving Photographer

2: EQUIPMENT SPECIFICATIONS:

SAAB Seaeye Falcon ROV:
- Depth Rating 350 Meters
- Sonar
- LinkQuest 1500HA Acoustic Tracking
- Kongsberg digital Stills Camera and Flash unit
- Seaeye Color Video Camera

Klein Associates Side Scan Sonar Model 3900
- Depth Rating: 1,000 meters
- Frequencies: 445 kHz / 900 kHz
- SonarPro Sonar Processing Software

Navigation
- Garmin Map 76 GPS
- Garmin 3010 GPS