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Abstract

All cultural materials are potentially cultural resources. However, because not all of them can be preserved or studied, choices must be made based on evaluation and re-evaluation. Values are learned and depend on cultural, intellectual, historical, and psychological frames of reference. Consequently, valuation is made individually, but is shared by communities. Valuation of underwater cultural heritage has, then, a broad range of determining value depending on the community to which it belongs.

A clear example of this is the protection of human remains. The 2001 UNESCO Convention includes, in its definition of underwater cultural heritage, human remains which have been underwater for more than 100 years. However, the Christian philosophy on the treatment of human remains is different to that of Asian philosophy that teaches that human remains will never become underwater cultural heritage since, if they are seen by someone in an underwater site, it is imperative to rescue the human remains and bury them on land according to their beliefs.

This session aims to create a forum for policymakers, managers, and archaeologists devoted to underwater cultural heritage where they can share their experiences of and research on the valuation of underwater cultural heritage. We aim to accept papers that help us to understand the definition of ‘underwater cultural heritage’ in the Asia-Pacific regions, comparing those definitions with the definition of the 2001 UNESCO Convention and trying to find a common interpretation. We will also be looking to examine the meaning of the underwater cultural heritage sites and objects for different communities. Finally, we will be expecting papers exploring the different possibilities of the use and/or conservation of this underwater cultural heritage according to the values and needs of the different communities.

Session Chair: Dr. Elena Perez-Alvaro
The ethics behind climate change: Small Island Developing States in the Pacific as new underwater cultural heritage

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Abstract
Predictions forecast changes in climate that may affect underwater cultural heritage in the future. Warmer waters mean more chemical changes and the proliferation of teredo navalis. Ocean currents may cause disturbances to the layer of sediment protecting underwater cultural heritage sites. The rises in sea levels would reduce the amount of time an air-breathing diver can safely spend underwater and hence their productivity. Rises would also mean expansion, which could raise the problem of ocean delimitation. Also our land tangible cultural heritage will be submerged: entire nations and their cultural heritage may disappear, an issue affecting mostly the Small Island Developing States -many of them in the Pacific-, more vulnerable to rises in sea levels. Their identity as citizens of their cities, as members of a community with their own tangible past, complete with their cultural heritage, will disappear. Their land heritage will become underwater cultural heritage but for more than 100 years will not be protected under the 2001 UNESCO Convention. This paper will look at climate change in these Asia-Pacific communities from the ethics as a core element and will study the introduction of these flooded areas as new underwater cultural heritage, proposing an Asia-Pacific values-orientated qualification of underwater cultural heritage as a natural resource.

Key words: SIDS, tangible cultural heritage, climate change, UNESCO Convention

Introduction
One of the commonly agreed principles of preservation of underwater cultural heritage named by the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage is the preservation in situ
as the first option (Preamble, Article 2.5. and Rule 1 of the Annex (UNESCO, 2001). The reason for this being mainly because archaeological objects are better preserved under layers of mud and in saline water. The ship, once she has sunk and lies at the seabed, reaches a state of equilibrium with the upper parts destroyed and the buried remains covered (Green, 1990). After reaching this state of equilibrium, the wreck will either be only disturbed by human intervention or by geological changes like the ones forecast by climate change (Wachsmann, 2011).

Global warming is, as (Chapman, 2003) observes, an environmental and political issue. Climate change is warming the oceans and the ice at the poles is melting causing sea levels to rise. Oceans are also being overfertilized and suffering chemical changes, such as acidification or changes on the salinity. Currents also may change their pattern and consequently, ecosystems are becoming increasingly endangered.

These climate changes will have a direct impact on underwater cultural heritage (Dunkley, 2013); (Van de Noort, 2013). Higher global surface temperature will dry out some submerged heritage and, on the contrary, sea-level rises will flood many coastal areas, creating new underwater cultural heritage. In fact, climate change will raise the sea level enough to inundate 136 sites considered by UNESCO to be cultural and historical treasures (Marzeion and Levermann, 2014). In addition, each one of the changes (warmer waters, changes in currents, rising oceans and chemical changes) will have a different effect on the various materials that constitute a submerged archaeological site.

Small Island Developing States (SIDS) are vulnerable to rises in sea levels and even become uninhabitable (UNESCO, 2008). In this regard, some authors warn that climate change will also modify social and cultural behaviours, with communities changing how they live and work, migrating
and abandoning their heritage. Therefore, all heritage needs to be considered vulnerable to natural disasters (UNESCO, 2008).

The first part of this paper will analyse some cases of sites affected by climate change that have already happened. Later, we will look at the concept of “climate change”. The third part studies what would happen to these Small Islands Developing States and the concept of identity. We will next be looking to both ethical and legal aspects of climate change affecting the cultural heritage. Finally, this paper will propose a new policy for the preservation of underwater cultural heritage under the threat of the climate change.

**Issue**

Climate change has already caused damages to underwater cultural heritage. Sheridan and Sheridan (2013) state that civilization is heading to informed self-destruction. They define culture as “the last cab off the climate rank”. Several examples:

1. In Spain, a Phoenician shipwreck is being exposed due to the change of currents affecting the oceans. The shipwreck that was 25 years ago at a depth of 6 metres it is now only at a depth of 1.8 metres (Rubio, 2014). Its preservation *in situ* may not be the best option anymore, since it is now readily accessible to human intervention and to further changes in the currents that may damage her.

2. The raising of sea levels has disturbed the underwater graves of soldiers killed in World War II on the Marshall Islands (McGrath, 2014). The tides have exposed a cemetery containing 26 human bodies and the coffins and human remains are being washed away.

3. According to a leaked diplomatic cable¹, the Dalai Lama called attention to the climate changes that Tibet is suffering. Although Tibet is entirely
landlocked, its temples are being inundated which will convert them to underwater cultural heritage in the future, an example that could be repeated:
The Dalai Lama argued that the political agenda should be sidelined for five to ten years and the international community should shift its focus to climate change on the Tibetan plateau. Melting glaciers, deforestation and increasingly polluted water from mining projects were problems that 'cannot wait.' The Dalai Lama criticized China's energy policy, alleging that dam construction in Kham and Amdo have displaced thousands of Tibetans and left temples and monasteries underwater. In view of these examples, climate change is an ultimate moral challenge and cultural heritage managers have to be prepared for policy’s changes (Sheridan and Sheridan, 2013). If the current global temperature is prolonged over the next two millennia, 40 of the UNESCO Cultural World Heritage sites will be affected. Of the 720 sites listed in the cultural and mixed categories in the UNESCO World Heritage list, 136 of them will be impacted by rises in sea levels (Marzeion and Levermann, 2014). In addition, 3 to 12 countries will lose more than half of their current land surface (Marzeion and Levermann, 2014). Consequently, climate change may affect the underwater cultural heritage in two forms:

   a) Additional submerged places will be created and, on the contrary, previously submerged places will become exposed.

A total of fifteen of the world’s twenty megacities are situated by the sea. “If water levels rise even further, by 3, 4 or 5 metres in centuries to come, we will have to give up some of the cities” (Rahmstorf and Richardson, 2009). These underwater cities or even countries will be in the future underwater cultural heritage. This paper will focus on this aspect.
b) The current underwater cultural heritage will be affected, damaged or moved. Variations in seawater follow universal chemical, physical and biological laws. The shipwreck, in contact with water, experiences equilibrium (Florian, 1987). At 400-800 metres depth archaeological sites experience low and near constant water temperatures all year-round (Daly, 2011). Sunlight, a biodeterioration accelerator, does not penetrate below 200m. At the seafloor the current speeds are often very low with minimal tidal effects and sediment transfer rates are also low. Erosion by currents, tidal movements or changes in water circulation, resulting in objects being removed and displaced is a real threat as well as erosion by dredging, fishing and anchoring. Sediment accretion will be also having consequences (Chapman, 2003): archaeological deposits could be buried by accreting silts. As a consequence, the discovering of the new underwater sites would be more difficult.

State of knowledge
Earth is a planet with high water content (71%). In fact it should be called Ocean, instead of Earth as the volume of water is 1370 million km³ (Rahmstorf and Richardson, 2009). There are four main climate changes that will affect the oceans:

1. The Warming of the Waters. There have always been fluctuations in water temperature, especially in the surface layer of water that is in direct contact with the atmosphere (the top 50–200 metres). The temperature in this layer has increased by more than 3°C in the last 50 years. Such an increase in temperature will most likely gradually spread to deeper layers, where shipwrecks and other heritage sites are located. This warming could result in changes such as coral bleaching and species migration. Other issues will also affect
underwater tangible heritage such as chemical changes or the increasing of shipworms.

2. **Currents.** Some experts predict that climate change could cause a possible interruption of the thermohaline circulation, largely responsible for regulating the earth’s temperature. Such change would affect the submerged heritage in different ways, such as the modification of the sediment layer. Much underwater cultural heritage is preserved at present thanks to a protective layer of sediment, mostly formed by microorganisms. Any disturbance of this layer could damage the archaeological materials. A change in currents can also displace some or all of a submerged archaeological site, decontextualizing it from its original location or otherwise dispersing the objects.

3. **Chemical Changes.** A variety of chemical changes might occur in the waters as a result of climate change such as acidity and salinity. If the pH of seawater decreases and the oxygen increases, it will become more acidic. As a consequence, underwater material is more likely to corrode. Also textiles dissolve more readily in acidic water, meaning any archaeological textiles remaining under water would likely be lost. Changes in salinity may also be proved problematic since salinity also accelerates corrosion.

4. **The Rising Sea Levels.** Increased global temperatures melts land ice, which adds water to the sea. Similarly, an increase in water temperature results in the expansion of the sea, since warm water occupies a larger volume than colder water. Sea levels react only very slowly, and it takes many centuries—or even millennia—for large continental ice masses to melt. However, since ice masses are becoming wetter because of the contact with water, they will almost certainly melt at a much faster rate. Researchers estimate
that there will be a rise in the sea level of between 18 and 59 cm by the year 2100; but it could exceed one metre. The rising sea level would be the most difficult challenge facing cultural heritage. Not only could it submerge the land-based cultural heritage, but underwater cultural heritage might also be affected. Some of the issues recognised in this regard are as follows:

- **Increased depth.** More water means greater depth and shipwrecks lying on the seabed will be subject to greater pressure, which may be more than they can withstand.

- **Prospection.** It would have an effect, mainly due to the reduction in the amount of time a diver can remain under water.

- **Marine boundaries.** Higher sea levels will result in legal maritime boundaries becoming less well-defined. Political issues and legal disputes are expected to arise in the affected areas and the melting of the Arctic will open new maritime commercial routes which will translate into claiming of new territories as we will see.

- **Flooding.** Some land-based archaeological sites will flood, meaning that some cultural heritage will become *underwater* cultural heritage.

- **Increased storms.** Higher sea levels will cause more powerful storms that will devastate low-lying areas. These will be in the form of tropical storms and hurricanes/cyclones, at best eroding at worst destroying both land and underwater heritage.

Although these are largely predictions for the future, some cultural heritage sites are already experiencing these changes.

**Small Islands Developing States**

The Pacific Islands region comprises 22 countries and territories, nine of them fully independent (Barnett and Campbell, 2010). It is divided into
three regions: Melanesia -of large cultural diversity and more than 800 languages spoken-, Polynesia -more homogeneous- with “only” 30 languages- and Micronesia -with strong links to the United States (Barnett and Campbell, 2010). This cultural diversity may change for the effects of climate change.

The IPCC 4th assessment report identifies small island states as being the most vulnerable countries of the world to the adverse impacts of climate change. The Pacific is in fact one of the world’s most vulnerable regions. Not only their cultural heritage will be affected but also their agriculture, water resources, forestry, tourism and other industry-related sectors. However, the impact of climate change in these communities will not only be noticeable on flooding lands, but also in its effects on agricultural production and fisheries, and, as a consequence, in the availability of food. However, there has been little research on understanding how people is going to adapt to climate change.

For instance, the Tuvalu State is already losing not only its territory because of the floodings, but also its identity and heritage: its culture as a nation is transforming. Communities on the Torres Strait are also suffering king tides and flooding that make life non-viable. The islands will probably be completely submerged in the future, meaning 7000 people already have to adapt to climate change. Australia has invited them to live on Australian territory but this would mean that the land of such states—and, therefore, their tangible culture—will be lost.

There are two basic responses to climate change for these territories: mitigation and adaptation. Mitigation includes all policies and laws that have been drafted on climate change. Adaptation has its origins in evolutionary biology, seen as the basis for natural selections and it implies long-term processes. This paper proposes a mix of mitigation and
adaptation actions in order to understand and face the effects of climate change on the cultural heritage.

**Ethical dilemmas**

This section will highlight the main ethical dilemmas attached to the loss of a territory, as it is going to happen to some Asia-Pacific States.

1. *Identity* seems a concept intrinsically linked to the concept of heritage. For Ashworth (2007) heritage is a need of the individual and of society to reinforce a socio-cultural identity: it is a contemporary commodity and it is linked to the concept of “national identity” that can be shaped through a few selected points of heritage and supporting mythologies. An object of heritage can become an evocative symbol of identification that acts as a trigger for emotions and narratives.

2. *Emotion*: this identification of a person with a place or an object is established because the person identifies itself with the place (or object) and feels something related to it. In this regard, Smith (2006) concludes that the “real sense of heritage is when our emotions and sense of self are truly engaged”. The emotional value of heritage is felt and it is reinforced through experiences and re-experiences that create a sense of nostalgia (Smith and Waterton, 2009). Heritage is then not valued for the specific information it contains but for the notions it evokes among people.

3. *Memories*: memories, as emotions, are not spontaneous but they need to be actively remembered (Smith and Waterton, 2009): they need a root in a concrete object or site and need to be maintained. Cultural heritage is intrinsically political and symbolic, used *in lieu* of description to evoke memories or emotions. And it is highly selective.

If some Small Island Developing States of the Pacific leave their territories and, as a consequence, part of their tangible cultural heritage,
they will lose part of their identity, their memories and the emotions that they experience with their heritage.

**Legal perspective**

Legislation can be used to minimize human threats to underwater cultural heritage. There is only 1.9 million km² of ocean area where nature conservation regulations apply. There is some Marine Protected Areas (MPA) but some authors (Rahmstorf and Richardson, 2009) believe that at least 20 to 30% of the world’s oceans should be protected.

The Intergovernmental Panel on Climate Change (IPCC, 2007), Group I concludes that the oceans are warming and the salinification of water is changing. Although they are not visible ocean circulation changes, the ocean biogeochemistry is changing since there is evidence of decreased oxygen concentrations. And the sea level is definitely rising (IPCC, 2007).

Despite of all this information, international instruments fails to protect cultural heritage from climate change forces (Sheridan and Sheridan, 2013). There are gaps in the capacity of the legislation for future protection. Only the *Convention Concerning the Protection of the Worlds Cultural and Natural Heritage* (1972) has some response to climate change (Sheridan and Sheridan, 2013). The *2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage* does not mention climate change as an adverse factor for underwater cultural heritage. However, Dromgoole (2013) feels that the term in the definition “partially or totally underwater, periodically or continuously, for at least 100 years” is of importance for the predicted sea level changes due to climate change. However, and despite this minor concession, the Convention does not explicitly mention “climate change” and as a consequence, it does not propose solutions. Neither the 1982 UNCLOS Convention does.
The *UN Framework Convention on Climate Change* (1992) has no direct reference to underwater cultural heritage, nor does the *Kyoto Protocol* (1997) which aims to reduce the levels of greenhouse gases. The instruments that try to cover the topic provide good intentions rather than solutions. They make a good starting point for the development of the field, although they tend to be vague and imprecise and no remedies are proposed. As a consequence, there is a need for ranking the potential impact of climate change on individual heritage and determining the vulnerability, sensitivity and resilience to future changes (Howard, 2003).

**Conclusions**

As this paper has tried to demonstrate, rises in sea levels, warmer waters, ocean acidification and changes in currents will affect underwater cultural heritage (Dunkley, 2013). Warmer waters mean more energetic oceans (that cause more erosion) and the migration of invasive species. It also means expansion, which will cause the problem of oceans delimitation. In addition, this rises in sea levels will reduce the amount of time and productivity an air-breathing diver can spend under water safely. In addition, saltier waters mean less clear waters. Changes in ocean temperatures also affect and alter oceanic currents which will have an impact on underwater visibility for divers besides of the erosion of the heritage. And although the direct effects of acidification are not still well understood (but it is known that will harm marine fauna) it increases the current rates of metal corrosion, which will be particularly harmful to the underwater heritage of the World Wars (Dunkley, 2013).

Each site deserves unique treatment and it is difficult to set common criteria. The climate change consequences on heritage need different strands of research, like risk factors, socio-economic research and nature and cultural stress factors (UNESCO, 2008). Some authors predict that
future generations will face damage and loss of underwater cultural heritage or will have to make great efforts to protect them (Marzeion and Levermann, 2014).

However, as Sheridan and Sheridan (2013) observe, it seems that people may need to see their cultural heritage threatened, temples washed away or cathedrals destroyed by flooding to be convinced of the effects of climate change in culture and to evaluate and propose solutions. However, it is erroneous to assume that the most visible remains are the most threatened. There is a need for practical and political response to the effects of climate change on underwater cultural heritage but also a priority of raising awareness of the impacts. Some authors emphasise the inadequate financial resources and a lack of creativity on managing underwater cultural heritage despite it being a growing “industry” (Kingsley, 2011). Some inter-agency cooperation might be necessary (Van de Noort, 2013), as well as convincing policy makers to include climate change impacts in planning (Cassar and Pender, 2005).

This paper proposes the inclusion of underwater cultural heritage as natural heritage, which is another subject on policy agendas for protecting the world’s oceans from climate change. The differentiation between cultural and natural is a barrier that excludes underwater cultural heritage and avoids a common interdisciplinary work, as it will be seen in the next section. However, is an Asia-Pacific values-orientated qualification of underwater cultural heritage as a natural resource, focusing on identifying and recovering the connections between the nature and culture sectors.

**Proposal**

The present study focuses the required actions to manage the underwater cultural heritage under the threat of climate change in four steps: recognizing the loss, starting the debate, creating a legal framework in
which situate the debate and recognizing underwater cultural heritage as a natural resource.

1. Recognizing the loss: there have already been two periods of climate change in the past which could have affected the heritage. It is essential to understand that although climate change does destroy the heritage, it also creates new heritage (for instance flooded cities or islands will become underwater cultural heritage in 100 years). This is an ethical issue on heritage as process: understanding that it is inevitable to lose some cultural heritage but that we will also gain some. On these premises, however, it is again the time to evaluate the importance of the sites and to undertake actions to preserve the selected ones.

2. Starting the debate: climate change debate has occupied few concerns in the archaeological and heritage arena. Whatever the causes, the effects may be devastating (Chapman, 2003). This paper has tried to trigger the debate, which needs to be discussed and disseminated through academic, social and political agendas.

3. Creating a legal framework: the 2001 UNESCO Convention that guides States on the management of their underwater cultural heritage does not include climate change as a danger to the heritage. As with any other international instruments, the authors of the Convention would hope to become an example to the states (Carman, 2013). If this Convention does not take climate change into consideration neither will States. This paper presents a high-risk concept: underwater cultural heritage is a part of the oceans and as a consequence underwater cultural heritage preservation has more similarities to underwater natural heritage than to terrestrial cultural heritage. Although the methodology (archaeology) and the ethical concerns that both underwater and land heritage face have a major equivalence, in the aspects of preserving and facing climate change, underwater cultural heritage has to fight the same battles as the
natural heritage in the oceans. The changes that will affect them are the same. As a consequence, the same legal and political agendas on climate change affecting the oceans should already include (as coral reefs are included) underwater cultural heritage on their agendas.

4. Recognizing underwater cultural heritage as a natural resource: Aznar-Gómez (2013) states that although underwater cultural heritage is not considered a natural resource by the UNCLOS Convention, the seabed and the sand is covering the archaeological objects. Also the non-sedentary fishing species live around artificial reefs made by shipwrecks. For this reason, some authors (Rössler, 2006) have tried to link cultural and biological diversity for the better preservation of underwater cultural heritage. In fact, the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage is an instrument for the preservation of both, cultural and natural heritage. Aplin (2002) argues that distinction between natural and cultural heritage is blurred and Chapman (2003) reminds the close relationship between ecological and archaeological site management and suggests a liaison between archaeologists and other parties interested in natural environment. Lixinski (2008: 379) claims that the “nature and culture dichotomy” listed in the 1972 World Heritage Convention is simply artificial, as it is proved to be in the wording “the combined works of nature and man”. According to the author, the holistic approach to heritage seen as “significance” and not as a place or as an object blurs that dichotomy. Accordingly, it is necessary to adjust natural policies on the oceans to accommodate underwater cultural heritage. If shipwrecks are considered artificial reefs, the same preservation policies applied to natural reefs can be applied to the artificial ones (that is, underwater cultural heritage).
Endnotes

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References


Biography

Elena Perez-Alvaro, doctor in Underwater Cultural Heritage, is a cultural heritage consultant for Licit Cultural Heritage Ltd. Her primary responsibility is to provide the clients with curatorial specialist advice, from management to legal or uses advice. Her publications consider ethical, legal and management aspects of cultural heritage, including the valuation and interpretation of cultural heritage, protection from climate change, the enhancement of intangible heritage, the relationship between natural and cultural heritage, cultural heritage of colonised countries or the cultural heritage of indigenous communities. She has also undertaken a wide variety of teaching posts, including at university level.
Preservation of Underwater Cultural Heritage in Taiwan: Legislation and Challenges

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Abstract

The Convention on the Protection of the Underwater Cultural Heritage was adopted in 2001 by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The convention acknowledges the importance of underwater cultural heritage as an integral part of the cultural heritage of humanity and a particularly important element in the history of peoples, nations, and their relations with each other concerning their common heritage. The responsibility of protecting and preserving the underwater cultural heritage therefore rests with all States (UNESCO, 2017.). By echoing the spirit of the above convention, the Legislative Yuan (Parliament) of Taiwan adopted the Underwater Cultural Heritage Preservation Act on November 24, 2015. The Act was promulgated by the President and was also put into force on 9 December 2015. The Law is in seven chapters with 44 articles. The chapters cover general provisions, attributed rights and international cooperation, activities involving underwater cultural heritage, in-situ preservation of underwater cultural heritage, excavation management in the sea, public education

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and professional training, penalties, and supplementary provisions. This paper introduces the recent research projects of underwater cultural heritage in Taiwan, illustrates the enactment process of the new law and highlights its main features. The paper concludes that it is essential to have further integration of management affairs, establishing national research institute, strengthening the international cooperation and the professional training, implementing related bylaws and mechanisms, and promoting public awareness, which also become daunting challenges faced by Taiwan as it marches toward the protection of its precious underwater cultural heritage.

Key words: UCH, Taiwan, UNESCO

Introduction
Underwater Cultural Heritage (UCH) refers to all traces of human existence having a cultural, historical, or archaeological character, such as ruins, architecture, handicrafts, human remains, boats, aircrafts, environments having an archaeological character and natural environments. According to Article 3 of Taiwan’s Underwater Cultural Heritage Preservation Act promulgated on December 9, 2015, “Underwater Cultural Heritage” means all traces of human existence having a historical, cultural, archaeological, artistic, or scientific character which have been partially or totally under water, periodically or continuously: (1) sites, structures, buildings, artifacts and human remains, together with their archaeological and natural context; (2) vessels, aircrafts, other vehicles or any part thereof, their cargo or other contents, together with their archaeological and natural context; and (3) objects of a prehistoric character. The UCH contains rich information related to cultures, history, geography and technology. A shipwreck, for instance, is testimony to trade and cultural dialogue between peoples. It also functions as a time capsule, providing a complete snapshot of the life on board at the time of sinking. Therefore, how to protect this common heritage of all mankind become the center of international concern.
Brief History of Legislation
Since 2000, some scholars in Taiwan, Professor Wen-Yan Chiau (later served as legislator) with the National Taiwan Ocean University, have being concerned about the protection of UCH and have organized several international conferences. In 2005, Professor Chiau was commissioned by Construction and Planning Agency, Ministry of the Interior to conduct a literature study on UCH in Dongsha (Pratas) Islands in the South China Sea. He concluded that at least 28 wrecks were clearly recorded. Over the past ten years, the UCH research projects made by the Academia Sinica and the National Sun Yat-sen University, under the authorization of the Ministry of Culture, discovered nearly 100 wrecks in the waters around Taiwan, including GUANG-BIN Warship that participated in the first Sino-Japanese War and British S.S. BOKHARA were sunk in Penghu (Pescadores) Archipelagoes, British SOBRAON near Matsu Islands and the unknown “GREEN ISLAND No. 1” in East Taiwan (Bureau of Cultural Heritage, 2014). These wrecks are as valuable as “NANHAI No. 1” and “DANDONG No. 1” of China and the important research projects in other countries. In the past, however, such precious UCH resources in Taiwan were not protected through a proper mechanism and were possibly destroyed by illegal and unappropriated underwater activities. Moreover, the important principles and spirit of the UNESCO UCH Convention have not yet been implemented in the domestic laws and the existing Cultural Heritage Preservation Act does not apply to the preservation, protection and management of UCH. Thus, there is an urgent need to formulate an exclusive law for Taiwan to preserve, protect and manage its rich and valuable UCH.

In view of this, the Ministry of Culture drafted a specific law called the "Law on the Protection of Underwater Cultural Heritage of the Republic of
China”. After years of discussions, the draft of Underwater Cultural Heritage Preservation Act was finally proposed by the Executive Yuan (Cabinet) and submitted to the Legislative Yuan (Parliament) for discussion. The Draft was completed gradually through researches conducted by experts and scholars commissioned by the Ministry of Culture, expert meetings, national public hearings, and related legal operating procedures as well as the acquisition of public consensus (Ministry of Culture, 2015). In the Legislative Yuan, Legislator Wen-Yan Chiau and Legislator Pi-Han Chen also proposed the corresponding versions (Legislative Yuan, 2015). Since the 8th session of the Parliament had limited time for UCH discussions, Legislator Chiau consulted Professor Nien-Tsu Alfred Hu and some key officials with the Ministry of Culture and integrated three versions into one, which served as the basis of discussion upon the consent of the Committee. On November 9, 2015, the integrated version was reviewed by the Committee and submitted to the Legislative Yuan for determination. On November 24, 2015, the Legislative Yuan finally approved the Underwater Cultural Heritage Preservation Act through a three-reading procedure. The Act was promulgated by the President on December 9, 2015, becoming the first exclusive law regarding the preservation of UCH in Taiwan (Office of the President, R.O.C., 2015). The approval and implementation of the Underwater Cultural Heritage Preservation Act ensure the effective preservation, protection, and management of UCH in the waters around Taiwan under a specific and clear legislation.

Principles and Main Contents
Taiwan’s Underwater Cultural Heritage Preservation Act consists of seven chapters with 44 articles in total: Chapter One "General Provisions", 

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1. **Respect and response to the spirit of the UNESCO Convention**

   The themes of Taiwan's *Underwater Cultural Heritage Preservation Act* are to preserve, protect and manage UCH, build the historical connection, and develop the characteristic of the maritime country in accordance with the spirit of the UNESCO Convention and other international agreements. In this regard, the Act includes the principles of the Convention in many articles with the hope to preserve and manage UCH in Taiwan like that operated in many parts of the world. For example, Article 4 of the Act reflects the spirit of the Convention and stipulates that “Any activity involving underwater cultural heritage should avoid unnecessary interference with human remains and historical sites” and that “UCH should not be commercially exploited.”

2. **Carry out general survey and registry management**

   Article 5 of the Act stipulates, “the competent authority shall undertake a general survey of underwater cultural heritage, or record and manage the files after conducting the investigation, research and review, in accordance with the procedures prescribed by this Act, on the reports from individuals or organizations that indicate a suspected underwater cultural heritage existed.” In addition, Article 6 also regulated that the competent authority shall fully set up case data for the investigation,
research, excavation, preservation, and restoration for underwater cultural heritage. The data shall be permanently preserved in accordance with the *Archives Act* and its relevant regulations.

The survey of underwater cultural heritage is also stipulated in Article 9 of the Act: “Where an environmental impact assessment is required for an exploitation activity, or where a governmental agency and state-owned enterprise makes or ratifies a plan with respect to exploitation and utilization of a water area, it is required to conduct a prior investigation related to the existence of underwater cultural heritage or suspected underwater cultural heritage. A notification of the discovery shall submit to the competent authority if any.”

3. **Establish a national institute for the preservation and research of UCH**

Referring to the foreign cases (e.g., Department of Underwater and Marine Archaeological Research, DRASSM, in Marseille, France), Article 7 of the Act stipulates that “the competent authority may designate a dedicated organization for the preservation and research of underwater cultural heritage to perform the investigation, research, excavation, restoration, education, promulgation, international cooperation, and other activities with respect to underwater cultural heritage.” For recruiting professionals to protect UCH in Taiwan, Article 11 of the Act also stipulates that “the competent authority shall educate and train the relevant professionals with respect to underwater cultural heritage in order to undertake the preservation of underwater cultural heritage.” The items, manners, procedures, examinations, evaluations, utilization, withdrawal, revocation, and other related affairs of the professionals will be further regulated by competent authorities after consulting related agencies.
4. **Establish a Review Mechanism**

   Regarding the administrative aspects, Article 8 of the Act expressly stipulates that the competent authority shall convene the review committee of underwater cultural heritage to review the following subjects: (1) applications for activities directed at underwater cultural heritage; (2) coordination with other authorities in charge of other affairs with respect to activities incidentally affecting underwater cultural heritage; (3) the recordation and management of underwater cultural heritage; (4) the zoning of underwater cultural heritage protection areas; (5) subject substantially relating to the preservation of underwater cultural heritage.

5. **Report the discovery of cultural relics**

   Pursuant to Article 13 of the Act, “anyone who discovers suspected underwater cultural heritage shall terminate any activity that has an influence on such heritage, maintain completeness of the site, and promptly report the discovery to the competent authority excepted that there is a need to prevent an urgent and severe danger or there is a substantial public interest at stake, such activity may not be terminated, and the discovery of such shall be reported to the competent authority.” After receiving the report referred to in the first paragraph, the competent authority may take the following measures: (1) restrict or terminate all or part of the activity which has an influence on the suspected underwater heritage in a specific water area; (2) undertake necessary investigation, research, and other related underwater operations; and (3) set up a temporary protection zone in the water area of the discovery site.

   Article 18 of the Act also stipulates that the citizen or the vessel master of the country, who discovers suspected underwater cultural heritage or activities directed at underwater cultural heritage in the
exclusive economic area or on the continental shelf of other states, shall promptly report such discovery or activity to the competent authority. The government of Taiwan may report such discovery or activity referred to in the preceding paragraph to the relevant states or international organizations.

6. **Stipulate right attribution and international cooperation**

The right attribution and international cooperation are included in Chapter 2 of the Act. For instance, Article 15 of the Act stipulates that “any underwater cultural heritage discovered in the internal waters and territorial sea of the Republic of China, except for the state vessels and aircraft in which a foreign state declares an interest, shall belong to the Republic of China.” “The Republic of China, in the exercise of its sovereignty, has the exclusive jurisdiction to regulate, authorize, or approve activities directed at underwater cultural heritage in the internal waters and territorial sea of the Republic of China.” With a view to cooperating on the best methods of protecting the state vessels and aircraft prescribed, however, the competent authority, should inform the flag state and, if applicable, other states with a cultural, historical or archaeological link, with respect to the discovery of such identifiable state vessels and aircraft. Additionally, Article 21 of the Act stipulates that the ROC government may enter into bilateral, regional or other multilateral agreements or develop existing agreements with other states or international organizations, for the preservation, protection, and management of underwater cultural heritage.

7. **Strictly regulate activities directed at UCH**

Article 22 of the Act stipulates that “activities directed at underwater cultural heritage shall not be undertaken unless an application with an
underwater cultural heritage activity plan is filed by a scholar, experts, or academic/professional scientific research institutions to the competent authority and approved thereby.” With the case of international cooperation, the Act further regulates that “foreigner(s) shall cooperate with domestic scientific research organizations or institutions to file such application.” Pursuant to Article 23 of the Act, those activities directed at UCH should be supervised by the competent authority; The competent authority shall also stipulate the regulations related to the UCH activities including the operational procedure, qualification of relevant operational personnel, method for in situ preservation, method for evacuated, preservation or protection method after excavation, and other matters related to the underwater cultural heritage activities should be complied with. Practically, this highlights the importance of bylaws of the Act.

8. **In situ preservation and planning for UCH protected areas**

With echoing to the spirit of the Convention, Article 27 of the Act expressly stipulates that “the preservation in situ of UCH shall be the first option before allowing or engaging in any activities directed at this heritage.” And, the proper means for in situ preservation may include recordation management, protection zone, or other proper preservation measures. When the review committees make a decision that it is necessary to designate a specific underwater cultural heritage protection zone, according to Article 28, the competent authority should consult with relevant authorities to designate and publicize an underwater cultural heritage protection zone within such water area to preserve the underwater heritage in situ. To allow the public engagement, Article 28 also regulated that the authority should hold a public hearing or explanation session inviting civilians or groups with an interest at stake to attend.
Article 30 of the Act regulates the content of the management and protection plan, which include the following: (1) basic data: location, measure of area, significance of the underwater cultural heritage, description and scope diagram of research; (2) range classification; (3) accountable authority distribution and reporting system (4) routine maintenance: preservation, maintenance and recordation of the environmental landscape; (5) emergency maintenance: prevention of natural or human damage and emergency disaster disposal; (6) education and promotion: production and exhibition of promotional material as well as education activities; (7) source of funding; (8) management plan of entrust; and (9) other matters related to management and protection.

For well managing UCH, Article 31 of the Act regulates the activities that are prohibited within UCH protection zone, such as salvage of UCH, usage of explosives, trawling or anchoring, mining, installation of electric cables and pipelines, discarding waste water or hazardous substances, dredging and construction of ocean engineering. As for management and protection of the underwater cultural heritage and settling illegal matters, according to Article 32, the competent authority may request assistance from the Coast Guard Administration to help in the enforcement of the Act.

9. Regulate the conditions for UCH salvage

In principle, the underwater cultural heritage shall not be excavated out of the water. Pursuant to Article 34, exceptions are only limited to the following situations: (1) the underwater cultural heritage related to historical status or recognition of the nation: (2) the absence of such underwater cultural heritage could be detrimental to a full understanding of human history; (3) the underwater cultural heritage is of substantial commercial value that cannot be protected without excavating it out of the water; (4) excavation is necessary for the investigation and research of
underwater cultural heritage; (5) the underwater cultural heritage cannot be sufficiently preserved, protected or managed without excavating it out of the water due to an emergency or the change of the existing environment; (6) other situations in which the competent authority deems necessary to excavate out of the water.

While excavation to be undertaken, pursuant to Article 35 of the Act, the preservation and maintenance plan for UCH should be proposed at the same time, and in which “non-destructive technology and survey method shall be used preferentially.” In addition, the expertise of underwater archaeology, underwater operators, and preservative scientist shall jointly participate in the measure for the excavation or emergency disposal.

10. **Stipulate strict penalties for protecting UCH**

Chapter 6 of the Act strictly stipulates the penalty provisions. As Article 37 regulates, for instance, any person who commits any of the following offenses shall be liable to imprisonment for up to five years, detention, and/or a fine of NT$200,000 to NT$10,000,000: theft of UCH with an intention to possess for his own or for a third person, damage of UCH within the protection zone or temporary protection zone, conveyance of UCH which belongs to the Republic of China out of the country, and undertaking UCH activities without prior approval of the competent authority. It is hope that the penalties can effectively stop the illegal activities which are harmful to the protection of UCH in this country.

**Challenges Ahead**

Over the past few decades, Taiwan has realized its richness of UCH through academic research and investigation, research projects commissioned by Ministry of Culture, findings by the local civil groups, fishermen or diving enthusiasts. However, these precious cultural relics
and artifacts were not protected properly due to the absence of related laws on the preservation of UCH in this country. Since the implementation of Taiwan’s *Underwater Cultural Heritage Preservation Act* is still in its infancy, the protection of UCH is unavoidably encountering many challenges as follows (Chiau and Kuo, 2014).

**Dissemination and Implementation of bylaws**

The *Underwater Cultural Heritage Preservation Act* is a fundamental law of Taiwan for the protection of UCH. In late 2016, the Ministry of Culture had already formulated some 9 bylaws for implementing the Act. They include the enforcement regulations on: UCH survey and management before development in the marine area, seabed and subsoil management, activities directed at UCH, UCH professionals training, promotion of public education on UCH, delineation and management of UCH protection zone, and incentives and subsidy on UCH research and protection. However, the challenges are to disseminate those concept of protecting UCH and smoothly implement those tasks among various stakeholders.

**Establishment of a national-level research institution**

Pursuant to Article 7 of the Act, the Ministry of Culture may appoint an institute responsible for UCH preservation, protection and management. It is believed that this national-level institute is able to best integrate various research resources, including technologies, professions and budgets. The DRASSM established in Marseille, France, for instance, is a national-level research institute with a history of more than 50 years. Having equipped with research vessels and many professionals, the Institute has been participating in various international UCH projects and has achieved abundant results with solid budgets and operations. In
2009, the National Research Institute of Maritime Cultural Heritage was established in Korea to promote the country’s maritime culture and exchange research results with other international research institutions or museums. These institutes are all worth referring to as Taiwan establishing its own one.

**Enhancing technologies and professionals training**

The technologies such as side scan sonar, multibeam depth sounding system, sub-bottom profiler and magnetometer have been applied in UCH survey and research in Taiwan (Liu, 2010). However, there is a necessity for developing and/or enhancing new technologies especially for those UCH buried in shallow waters, lagoons, estuaries and river bed.

On the other hand, it is in short of UCH professionals in Taiwan. Over the past ten years, although several training workshops for underwater archaeology have been held in Taiwan, few trainees are willing to engage in underwater archaeology due to limited job opportunities. After the Act is promulgated, the demand for professionals will definitely increase. The Ministry of Culture should be keen to training and employment of UCH professionals, especially their appropriate and stable job opportunities. The Ministry should also have professionals recruited in its subordinated agencies and even engage the international professional certification in order to provide appropriate and safe jobs for UCH professionals.

**Strengthening international exchange and cooperation**

Pursuant to Article 19 of the *Convention on the Protection of Underwater Cultural Heritage* promulgated, the UNESCO urges the international cooperation and information sharing regarding the protection of UCH. As mentioned above, the research, protection and management of UCH is still in its infancy in Taiwan. As a cultural entity and a responsible country,
there is essential to learn from and/or work with other countries for better managing the common heritage for all mankind.

**Raising the public awareness on UCH protection**

With the development of underwater technologies and diving techniques, it is easy to dive into the deep sea, resulting in more opportunities of discovery, collection and destruction of UCH. However, different from treasury hunting, the concept of preservation of UCH must promote through the nation-wide education and propaganda to raise the public awareness of the protection of UCH. Firstly, the government may include UCH concepts in the textbooks for the public schools and encourage universities to establish related departments on UCH research. Secondly, many countries establish maritime museums and marine parks to encourage the public to engage in cultural tourism. For example, underwater museum in Alexandria, Egypt, Mary Rose in the UK, Baiheliang Underwater Museum in China, Underwater Archaeological Park in Finland and Dalarö Blue Park in Sweden showcase the creativity by combining nature and cultures. These examples are all worth referring to for raising the public awareness on UCH. In the aspect of social education, the educational promotion for diving enthusiasts is especially important in this case.

**Improving integration among related government agencies**

The management of UCH involves many aspects, including investigation, research, excavation, repair, education, promotion, supervision, enforcement, international cooperation and other related activities. Many government departments and agencies may engage in the administrative procedures in Taiwan, including Ministry of Culture, Ministry of Education, Council of Agriculture, Coast Guard Administration, Ministry of the Interior,
Ministry of Foreign Affairs, Ministry of Transportation and Communications and local governments. Related stakeholders and interested parties, such as fishermen, diving clubs, or recreation industries are also involved. In view of this, a better governance of UCH issues will rely on the close cross-department cooperation. And, integration among the related agencies is a must and represents a daunting challenge faced by Taiwan.

**Concluding Remarks**

Although Taiwan’s *Underwater Cultural Heritage Preservation Act* is promulgated, daunting challenges remain in the implementation of this brand new legal system. It is hope the government can facilitate the establishment of a national research institute of UCH, training programs for professionals and the public awareness of the protection of UCH. International cooperation and information sharing also deserve the priority.

**Reference**


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The elaboration of the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage

Etienne Clément

Abstract

The UNESCO Convention on the Protection of the Underwater Cultural Heritage was adopted in 2001. Like many such treaties, its text is the result of a compromise between opposing views. The negotiations leading to this instrument started in the Eighties at the initiative of underwater archaeologists who teamed up with lawyers and with the International Law Association. These pioneers considered that the United Nations Convention on the Law of the Sea (UNCLOS) did not protect adequately the underwater cultural heritage. But many States Parties to the UNCLOS were reluctant to re-open any kind of negotiation that might affect the delicate balance of the UNCLOS. Moreover, the industry of salvage was also extremely reluctant to any new international legislation that may affect their activities, especially in the high seas. The process of preparation of an international legal instrument was suspended several times. It was finally put on tracks thanks to the pugnacity of a few UNESCO staff and ICOMOS members supported by Ministries of a Foreign Affairs of several countries who convinced the UNESCO General Conference to enter the process of elaboration of a Convention. During the negotiation of the text, the views expressed by the delegations of UNESCO Member states were often antagonistic. In the discussions, the ICOMOS Committee on Underwater Cultural Heritage (ICUCH) played a major role, by sensitizing the diplomats to the urgency of adopting a legal instrument at a time when technology had made possible to explore practically all ancient vessels lying on the seabed. The author has participated in some key steps of the elaboration of the Convention and will present some of the legal and ethical positions expressed at the negotiations and that have led to the compromise adopted in 2001.

Key words: UNESCO, UNCLOS, outreach, UCH
Introduction

The protection of the underwater cultural heritage, in particular ancient shipwrecks laying on the seabed under various jurisdictions, is by nature an international issue. It is therefore natural that the United Nations, in particular UNESCO as the specialized agency with the UN mandate for cultural heritage, has looked into the matter and adopted in 2001 the Convention on the Protection of the Underwater Cultural Heritage, one of the seven UNESCO Conventions in the area of culture. It was elaborated as a response from the international community to the removal and destruction of underwater cultural heritage by industrial activities and by the so-called “treasures hunters”. The Convention reflects the growing recognition of the need to ensure the same protection to underwater cultural heritage as that already accorded to land-based heritage. It provides legal protection, enables States Parties to adopt common approaches to preservation and provides effective professional guidelines. The mains principles of the convention and its Annex had long been endorsed by professionals in UCH. It is to be remembered that the draft of the Annex was drafted by UCH professionals who started working on it in 1983. The Convention entered into force in January 2009. As of 15 July 2017, 57 countries are States Parties to it, which is an honorable score but does not give it the status of a universal instrument. For instance only two countries in Asia and the Pacific have joined it. But those States which joined it made an important commitment by agreeing on rules applicable by vessels bearing their flag and by their nationals, including also the treasures hunters.
**Keys steps towards a Convention**

UNESCO has been concerned with the protection of UCH since its early days. Its *Recommendation on International Principles Applicable to Archaeological Excavations*, a non-legally binding text adopted by the General conference in 1956 applies also to underwater archaeology.

The Council of Europe, as early as 1978, began to develop a draft European convention for the protection of the underwater cultural heritage. The draft reached an advanced stage but was never adopted by the Council of Ministers.

The issue was raised again during the negotiations for the United Nations Law of the Sea Convention and resulted, in the closing days of these negotiations, in the adoption of two articles (149 and 303). However these articles are widely felt by cultural experts to be unsatisfactory and incomplete. They are indeed ineffective to protect underwater cultural heritage beyond the contiguous zone, they do not resolve the conflict between ownership claims, salvage claims and cultural heritage interests and they do not give any guidance on how underwater cultural heritage should be treated. They are also sufficiently ambiguous to give rise to alternative interpretations.

In 1990, under the leadership of its Chairperson, Professor Patrick J. O'Keefe¹, the Cultural Heritage Law Committee of the International Law Association undertook to study the international legal protection of the underwater cultural heritage. It produced its first report and a draft text of a convention for the meeting of the International Law Association in Cairo in 1992. One year later, the Director-General of UNESCO was requested by the UNESCO Executive Board to undertake a study into the feasibility of a new international instrument. As the International Law Association

ⁱ O'Keefe Patrick J.
had an advisory status with UNESCO and was well advanced in its work on a draft convention, the Director-General decided to wait until the ILA work was complete before reporting back to the UNESCO Executive Board. In 1994, in Buenos Aires, the Cultural Heritage Law Committee produced its final report and draft convention to the ILA meeting which adopted it and transmitted it to the Director-General of UNESCO.

In parallel to this legal process, a group of influential underwater archaeologists who were members of the International Council of Monuments and Sites (ICOMOS) created the ICOMOS Committee for Underwater Cultural heritage (ICUCH) and advocated within ICOMOS for the development of specific ethical and professional standards for underwater archaeology. They argued that underwater archaeology had particular requirements related to its environment which has led to the development of specific techniques and that underwater conservation is always a pressing and expensive immediate necessity. Their efforts led to the preparation and adoption of the International Charter on the Protection and Management of Underwater Cultural Heritage by ICOMOS General Conference in Sofia in 1996. To be noted that the ICUCH played a major role during the whole negotiation process of the 2001 Convention, in particular through its Chairpersons, Graeme Henderson (Australia) and Robert Grenier (Canada).

With the ILA draft in its hands, as a useful basis for a possible new instrument, the UNESCO Secretariat was ready to start preparing a feasibility study requested by the Executive Board. Within the UNESCO Secretariat in 1994, Dr. Lyndel V. Protte was the Head of the International Section of the Division of Cultural Heritage. She played a major role, as a renowned lawyer and an international civil servant, all over the process of elaboration of the Convention. I had the honor to be the other member of
her two-person team and rejoined later by a then junior colleague, Mr. Ieng Sroeng. In preparing the feasibility study, the Secretariat looked at the relevant articles of the United Nations Convention on the Law of the Sea and at the International Charter on the Protection and Management of Underwater Cultural Heritage.

In 1995, a large number of artifacts found in the wreck of the Titanic, which was discovered several years before, were exhibited all over the world. This travelling exhibition gave a sort of technology signal that most shipwrecks that could be found on the seabed were technically accessible and that cultural objects could be removed. At the occasion of one such international exhibition in Greenwich (United Kingdom), an expert meeting was organized for legal experts and underwater archaeologists. It included those experts who had worked on the ILA draft and the ICOMOS Charter as well as lawyers familiarized with salvage Law. The discussions anticipated the difficulty of finding a compromise on a draft legally-binding text which could be accepted and implemented universally.

The Director-General submitted the feasibility to the Executive Board in May—June 1995\(^2\) and recommended that this Board transmits its recommendation to the UNESCO General Conference which has the authority, under UNESCO’s constitution, to decide on the elaboration of a Convention. But during the discussion, although a number of delegates emphasized the urgency of the situation, the majority requested more time before launching the preparation of a Convention. They insisted that the jurisdictional aspects of the question should be further studied, namely the compatibility of a possible new convention with the provisions on jurisdiction contained in the United Nations Convention on the Law of the Sea (UNCLOS).
Therefore, instead of transmitting the Director-General’s recommendation to the General conference, the Executive Board requested him to urgently convene an expert meeting to discuss this issue and to report to the General Conference just a few months later. But the time was too short between June and October 1995 to convene, before the General Conference, an expert meeting based on a fair geographical balance and representing the various interests involved. The Secretariat therefore wrote to all countries which had expressed an interest in order to receive their comments on the feasibility study. Thirteen replies (Australia, Colombia, France, Germany, Greece, Italy, The Netherlands, Philippines, Spain, Turkey, United Kingdom, United States and the U.N. Division for Ocean Affairs and the Law of the Sea) were received. A majority of them were in favor of a Convention. But divergent opinions were expressed about the content of the norms, for instance on the concept of a specific cultural heritage zone or on specific protected areas. It was also accepted that UNESCO was the appropriate forum and that the norms to be prepared should duly take into account the balance achieved in the UNCLOS Convention.

The 1995 session of the UNESCO General Conference did not launch yet the formal process of elaborating a Convention. Instead, it invited the Director-General:

- to pursue further discussions with the United Nations in respect of the UNCLOS and with the International Maritime Organization (IMO)
- to organize, in consultations with UN and IMO, a meeting of experts representing expertise in archaeology, salvage and jurisdictional regimes
- to make the views of the experts known to UNESCO Member States and invite their comments;
- and to report back to the 29th session of the General Conference (1997)

Therefore UNESCO Secretariat had proposed to the IMO (London) and
to the United Nations Division of the Law of the Sea (New York) to
nominate some of the above experts in order to ensure consistency with
the work already developed within these two organizations. The expert
meeting took place in May 1996. It was chaired by Dr. Carsten Lund
(Denmark). To be noted that Dr. Lund remained the Chair of all further
intergovernmental experts meetings that took place until the adoption of
the Convention in 2001. The 1996 meetings was an important one
because it agreed that a possible Convention be grounded on the principle
incorporated in Article 303 (1) of the UNCLOS Convention which says
that: “States have a duty to protect objects of an archaeological and
historical nature found at sea and shall cooperate for this purpose”. The
majority agreed that UNESCO was the right venue for such a Convention,
although a minority group believe that it should be adopted within the Law

The General Conference finally gave the green light for a Convention in
October 1997 at its 29th session. It decided that the question should be
regulated and that the method adopted should be an international
convention. It invited the Director-General to convene meeting, but this
time with expert representing their Governments. Four such governmental
experts meeting took place from 1998 to 2001. The UNESCO Convention
on the Protection of the Underwater Cultural Heritage was finally adopted
on 2 November by the Plenary Session of the 31st General Conference
with 88 votes in favor, 4 against and 15 abstentions.
Major issues during the negotiation of a Convention

The three main issues at the core of the experts’ deliberations were:

- the jurisdiction (including the necessary compliance with the UNCLOS)
- the relation with the Law of salvage or salvage law
- the standards for research in underwater cultural heritage.

Jurisdiction

Fig. 1: The maritime zones.

In the territorial sea, the national legislation of the coastal State applies to underwater cultural heritage. Beyond the territorial sea, the coastal State’s jurisdiction is generally very limited under national legislations. Often the coastal States have jurisdiction over their own nationals and vessels bearing their flag. But it is often expressed in vague terms and with serious difficulties of implementation without any State cooperation system.
Underwater cultural heritage being largely located in the oceans which fall under the Law of the Sea Convention, its legal regime falls under UNCLOS articles 149 and 303:

Article 149 Archaeological and historical objects.

All objects of an archaeological and historical nature found in the area shall be preserved or disposed of for the benefit of mankind as a whole, particular regard being paid to the preferential rights of the State or country of origin, or the State of cultural origin, or the State of historical and archaeological origin.

Article 303 Archaeological and historical objects found at sea

i. States have the duty to protect objects of an archaeological and historical nature found at sea and shall co-operate for this purpose.

ii. In order to control traffic in such objects, the coastal State may, in applying Article 33, presume that their removal from the sea-bed in the zone referred to in that article without its approval would result in an infringement within its territory or territorial sea of the laws and regulations referred to in that article.

iii. Nothing in this article affects the rights of identifiable owners, the law of salvage or other rules of admiralty, or laws and practices with respect to cultural exchanges.

iv. This article is without prejudice to other international agreements and rules of international law regarding the protection of objects of an archaeological and historical nature.
These articles, according to archaeologists and lawyers concerned with the preservation of the underwater cultural heritage, were considered as insufficient for an effective protection of the cultural heritage. Indeed, in the Exclusive Economic Zone and on the Continental Shelf, UCH remains practically unprotected. Another serious problem is that the provision in Article 303 stating that “Nothing in this article affects the rights of identifiable owners, the law of salvage or other rules of admiralty…” appeared to protect the commercial exploitation of historic shipwrecks, leading to the destruction of archaeological resources without their scientific examination. The relation with salvage law was therefore an issue of very lively discussions, often antagonistic, during the several experts meetings from 1998 to 2001.

Salvage law

Salvage Law or Law of Salvage or Law of Finds is based on practical and economic considerations. The function of salvage is to encourage the recovery of goods at sea that are in danger of being lost. The primary objective of the salvage industry, recognized in salvage law, is the recovery of commercially valuable property from a shipwreck. But in some countries, the salvage industry had extended its activity to commercial exploitation of submerged archaeological sites, often by teams of unqualified persons. Therefore for many years archaeologists had been concerned by the loss of scientific information caused by such unprofessional excavation and by the destruction of artefacts not considered commercially valuable.

The activities of the salvage industry were regulated by the 1989 International Convention on Salvage, adopted under the auspices of the International Maritime organization (IMO). It does not include provisions on the underwater cultural heritage. As the Article 303, iii, of the UNCLOS
protects salvage law, most experts considered that the international legal framework in 1998 was an invitation to looting.

**Standards for research in UCH**

When the first meeting of experts opened in 1996, the International Council of Monuments and Sites (ICOMOS) had just adopted its International Charter on the Protection and Management of Underwater Cultural Heritage at its General Conference in Sofia (see above).

To be noted that the International Law Association had included in several provisions of its draft Convention on UCH that underwater excavations were to be undertaken in accordance with the ICOMOS UCH Charter, which would be an annex to the ILA draft.

Therefore given the importance of the ICOMOS Charter which sets standards for research and conservation of the UCH, the members of the ICOMOS Committee for Underwater Cultural heritage (ICUCH) were associated closely to the elaboration of the text of the UNESCO Convention. They were very influential in the process leading to the adoption of the 2001 Convention.

**The way towards a compromise**

The process involved a long and patient campaign initiated by underwater archaeologists in Europe, Australia, North America and later in other regions. They needed to convince even their own peers - i.e. the ‘land’ archaeologists- to team-up with them in order to convince Ministries of Foreign affairs of their respective countries to support the idea of a Convention. Indeed in many countries Ministries of Foreign Affairs were quite hesitant to open negotiations on an issue related to the Law of the Sea, only a few years after the entry into force of the UNCLOS Convention. To be noted that members of the International Law
Association (ILA), especially Professor Patrick J. O’Keefe, the Chairperson of the ILA Cultural Heritage Law Committee, played an important role in the informal lobby in favor of an effective convention. Other influential institutions included ICOMOS, ICUCH, the International Council of Museums (ICOM) and several Maritime museums all over the world.

In 1998, reaching of a compromise to be included in a Convention appeared to be very challenging. At the beginning of the discussions, there was a consensus only on the necessity to avoid creating a new “archaeological zone” in addition to the zones established by UNCLOS. There was also an agreement that a Convention should refer to some kind of guidelines on how to treat UCH.

All the other issues were the object of profound divergences between experts and between the UNESCO Member States. However, gradually, a consensus emerged to obtain protection of UCH wherever it is located beyond the territorial seas, in all maritime zones including international waters, through a State cooperation system.

The salvage Industry was also represented in the experts meetings. Indeed at the request of the UNESCO General Conference, UNESCO Secretariat had asked the International Maritime Organization (IMO) to designate experts to represent the interests of the maritime industry, including the salvage industry. The Tourism diving industry was not invited as such, but several countries’ delegations included experts which expressed the views of this sector. The consistency with the UNCLOS Convention was ensured by representatives of the UN Division of the Law of the Sea (New York) who played a very positive role in this respect. Some “Treasures Hunters”, although not invited officially, showed up at one of the meetings and opposed the adoption of a text, without success.
To be noted that “treasures hunters” were more influential among international TV channels, which, during the years of the negotiations, displayed TV shows glorifying their activities.

The negotiations also had to face language difficulties. For instance, archaeologists and lawyers understood differently the concept of “rules”, the former saw them as rules applicable to professionals and the latter as rules applicable to States. This has rendered the role of the courageous Chairperson, Dr. Carsten Lund (Denmark), an almost impossible task.

The composition of each country’s delegation was also a challenge. Only important delegations could include international lawyers, cultural heritage lawyers, salvage lawyers as well as archaeologists. But most delegations were composed of only one international lawyer, often with little background in archaeology.

**The compromise adopted in 2001**

Despite the antagonistic positions that continued to be expressed during the whole negotiation process, a compromise was reached in 2001. It included a very advanced State cooperation system containing provisions of legal and professional or ethical nature binding both States parties and UCH professionals. The Convention was structured under a main text and an Annex which is an integral part of the Convention. The main text contains basic principles for the protection of UCH and a detailed State cooperation system. The Annex includes widely recognized practical rules for the treatment and research of UCH which reflects practically the text of the ICOMOS Charter.

The basic principles of the Convention include the obligation to preserve UCH “for the benefit of humanity”, the “in situ” preservation as the first option (not the only one), a commitment for no commercial exploitation
and an obligation of training and information sharing. It does not include the sovereignty rights of States and the issue of the ownership of wrecks which remain regulated by civil law, other domestic law and private international law.

The compromise on the relation with salvage law was one of the most difficult to reach. It is contained in Article 4 of the 2001 Convention which excludes the application of salvage law, except when and if three cumulative conditions are met:

**Article 4- Relationship to Law of Salvage or Law of Finds**

Any activity relating to underwater cultural heritage to which this Convention applies shall not be subject to the law of salvage or law of finds, unless it:

(a) is authorized by the competent authorities, and
(b) in full conformity with this Convention, and
(c) ensures that any recovery of the underwater cultural heritage achieves its maximum protection.

But the Convention was not adopted by consensus. The Culture commission of the General Conference had recommended the Plenary of the UNESCO 31st General Conference to adopt the draft Convention by 94 votes in favor, 5 against and 19 abstentions. The Plenary adopted it with 88 votes in favor, 4 against and 15 abstentions.

**Conclusion**

Sixteen years later, the Convention is ratified by 57 countries. This relatively low level of ratification can be explained by several factors. Perhaps it still reflects the fact that the Convention may have a few
detractors among some of the UNESCO Member States. But most probably, many countries do not consider the ratification as a priority as they do have the technology nor the human or financial resources to be involved in activities towards the underwater cultural heritage. In these countries, there are also very few archaeologists who have training in underwater archaeology. There is therefore no effective influential group that could persuade their respective authorities to join the Convention or that could campaign among the public on the importance of this heritage for their country and for humanity. But the advancement of technology and the ability of a growing number of countries to own such technology may however have a positive influence on the rate of ratifications in the following years.

Endnotes
1 Professor Patrick J. O’Keefe has worked for more than 40 years on legal instruments to protect the underwater cultural heritage. He has.
3 UNESCO General Conference Document 29C/Resolution 21
4 UNESCO General Conference Documents 31C/24 and 31C/Resolution XV, para D
6 UNESCO General Conference Documents 31 C/24 and 31 C/Resolution XV, para D

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Biography

Etienne Clément, JD 1978, LLM International Law 1980, (University Brussels) had responsibilities in UNESCO 1984-2015. He contributed to the development of international standards for the protection of cultural heritage, including to the elaboration of 2001 Underwater Cultural Heritage Convention. From 1998, he was UNESCO Representative to Cambodia, Deputy Director Field operations (Paris), Deputy Director Regional Bureau (Bangkok) and Director Pacific States. He is author of articles on conventions for cultural heritage and is currently advising governments on these instruments. He lectures at Science Po Lille (France) and is member of ICOMOS International Committee on Legal, Administrative and Financial Issues (ICLAFl).
A non-member State’s practice on the incorporation of the UCH Convention: Taiwan’s experience

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Abstract

The United Nations Organization for Education, Science and Culture (UNESCO) adopted the Convention on the Protection of the Underwater Cultural Heritage in 2001 which entered into force in 2009. In order to preserve, protect and manage underwater cultural heritage, State Parties should preserve underwater cultural heritage and take actions accordingly. The R.O.C. has followed the developments afore mentioned since 1999, and a specific legislation “Underwater Cultural Heritage Preservation Act” was enacted and entered into force in 2015 while facing various challenges along the way, even the R.O.C. is not a member of the UNESCO nor a Party to the Convention. The emergence, evolution, and practice in terms of the incorporation of the Convention into domestic legislation warrants the necessity of in-depth studies and further theorization since such experience relates to the success or failure of policies with respect to the incorporation of international conventions into domestic legislation. This paper provides an analytical assessment on the approaches that the R.O.C. incorporated the Convention through applying or modifying relevant theories regarding the incorporation of international conventions into domestic laws, and suggestions on confronting similar challenges.

Key words: UNESCO, Convention on the Protection of the Underwater Cultural Heritage, incorporation into domestic legislation

I. Forward

The adoption and ratification of the UNESCO Convention on the Protection of the Underwater Cultural Heritage (hereinafter referred to as the UCH Convention) have had an impact on the international community, including Taiwan. Taiwan is not a UNESCO Member State nor a party to the UCH Convention and has no international law duty to sign, approve
or comply with the UCH Convention. In response to this change, under the commission of the Ministry of Culture (hereinafter referred to as the MOC and its predecessor Cultural Affairs Council, hereinafter referred to as the CAC) and supervision of scholars, the author has participated in this academic research and bill drafting, namely the permanent “Underwater Cultural Heritage Preservation Act” (hereinafter referred to as the UCHPA), the “Rules for the Implementation of the Underwater Cultural Heritage Preservation Act,” the “Guidelines for Underwater Archaeological Work,” and the “Rules for the Management of Activities directed at Underwater Cultural Heritage.” The adoption and implementation of the UCHPA not only demonstrates Taiwan’s political will in participating this international affair, but it also affects the agency authority, legal regimes, and marine affairs management domestically.

The experiences mentioned above may cast new light on Taiwan’s incorporation of other international instruments in the future, even more for other smaller countries like Taiwan with respect to UCH issues. The author exams Taiwan’s relevant laws regarding UCH, and takes an overlook on the incorporation of the UCH Convention, particularly related bill-drafting processes. Finally, some preliminary observations are illustrated.

II. Taiwan’s incorporation process

According to surveys conducted by the Academia Sinica group headed by Academician Chent-Hwa Tsang, at least fifteen shipwrecks have been confirmed surrounding the waters of Taiwan, and part of them have been listed on the national register. Besides, some UCH were discovered in inland waters. These UCH continue to face a threat from man and nature, and such danger should be reflected in national policies and legislations for their preservation, protection, and management.
The Cultural Heritage Preservation Act (hereinafter referred to as the CHPA) is the core of Taiwan’s legal protection of cultural heritage. However, the CHPA is dominated by inland concept, with extremely limited sea or underwater notion or almost non-existent. In the 2002 amendment of the CHPA, it was stipulated that “res nullius antiquities” and “res nullius ancient monuments” in submerged water are state-owned, and finders would be rewarded accordingly. These provisions were deleted in the 2005 amendment, leaving only that international investigations and excavations of sites within the territorial sea of the R.O.C. are regulated and authorized. This removal led to an insufficient linkage between the CHPA and the preservation, protection, and management of UCH. Nor can it be the foundation for the MOC as the competent authority in charge of UCH. Legally speaking, the CHPA can no longer be the basis for the preservation, protection, and management of UCH, nor it be part of the so called “relevant laws and regulations” in the “Law on the Territorial Sea and the Contiguous Zone of the Republic of China (hereinafter referred to as the LTS).”

Other laws directly regarding UCH are unavailable to be applied as a groundwork for the preservation, protection, and management of UCH. Article 16 of the LTS states:

‘The historical relics or monuments found in the archaeological, scientific research, or any other activities in the territorial sea and the contiguous zone of the Republic of China shall be owned by the Republic of China and shall be disposed of by the relevant laws of the Republic of China.’

The provision was delivered by the Legislative Yuan (namely the Congress) in the bill review process, not the Executive Yuan (namely the Cabinet). The Congress raised the article based on articles 33 and 303 of the United Nations Convention on the Law of the Sea focusing on State ownership or disposition, without taking into account the shortcomings of
the Convention at the time of its adoption of the two articles, and the international law in which the international community was engaged in the UCH issues. The LTS could not be the appropriate legal foundation for the preservation, protection, and management of the UCH.

Given the general needs of Taiwan to promote her national marine policy, a scholar advocated the position and function of the UCH legal regime from the policy and maritime legislation perspective and drafted a UCH bill. The initiative is the initial driving force for Taiwan’s incorporation of the UCH Convention. In 1997, under the commission of the Ministry of the Interior, scholars submitted a report themed as “Strategic Arrangements Regarding Maritime Legislations.” They proposed that maritime legislations should be carried out to push forward the national marine policy, including an “Underwater Cultural Heritage Act” (Hu, 1997). Afterward, in 1998, scholars drafted the first “Bill of the Protection of the Underwater Cultural Heritage, Republic of China” for the CAC (Hu, 1999). However, the draft bill was not submitted to the Congress. The reasons behind deserve a detailed discussion.

In 1997, the CAC invited scholars and relevant agencies to review the provisions of the CHPA. The academic representatives supported the regulation of UCH in the CHPA and had only different opinions on its practices, such as abstract or a particular chapter. The scholar who drafted the LTS called for a particular legislation regarding UCH. Officials are conservative on the issue. The CAC delegation expressed his doubt about the necessity of developing a particular bill regarding UCH. The delegation from the Ministry of Education stated that it was immature to deal with the theme. The Ministry of the Interior said that at the present stage, due to coordination difficulties, unless the MOC is established in the future and exercises authority over ancient antiquities as well as
monuments, the government should act in accordance with the CHPA. They reached the final resolutions as follows:

Before the MOC is established, the primary task of the CAC falls mainly on cross-agency coordination and consultation. In principle, the CAC respects the authority of the Ministry of Education and the Ministry of the Interior. Some of the relevant standards regarding the protection of UCH provided in this meeting are incorporated from the UCH Convention, and others are from draft bills. However, whether it is mature to incorporate these norms into our local law should be reconsidered. These international norms must be quite mature enough to be incorporated. It is significant to protect UCH, and the government should pay more attention and collect information. Most of the relevant problems regarding UCH could be solved according to article 16 of the current LTS. When it comes to amending the CHPA, some issues need to be reconsidered: how to rule UCH in the CHPA? Is there an immediate need? How about the maturity of the international norm (draft)? Even if we take the terms of the license clauses, the scope of the mandate will also involve the issue of legal retention, and the concept of res nullius seems to have not yet reached a consensus domestically.

The case is proposed to maintain the status quo, and relevant agencies shall collect more information on this topic and have in-depth analysis, as soon as the overall structure and concept are mature, the amendment of the CHPA or a particular legislation is available.

The CAC has commissioned the National Sun Yat-sen University (The Center for Marine Policy Studies) in June 1999 to complete a research program and put forward a particular bill for legislation\(^4\). The report has been delivered to the relevant agencies for reference.
Before the establishment of the MOC, the Ministry of Education command the preservation as well as maintenance of archaeological relics, and the CAC should fully collaborate with the Ministry of Education.

In fact, it is difficult to solve most of the related problems mentioned above by the LTS. The government exercises jurisdiction over UCH in the territorial sea and contiguous zone of R.O.C. only, and the maritime jurisdiction is less than that by the CHPA. The comprehensive application of the laws results in a lack of jurisdiction over UCH in the contiguous zone and beyond. Furthermore, the LTS only stipulates ownership over UCH with other aspects of UCH preservation, protection, and management blank, especially international cooperation. Legal vacuum undoubtedly impedes the protection of UCH.

Since 2006, the CAC commissioned various research programs regarding UCH issues (Hu, 2006). In 2008, the scholars resubmitted an “Underwater Cultural Heritage Preservation, Protection and Management Act (Draft)” to the CAC, that is, the predecessor of the UCHPA (Hu, 2008). In 2012 the MOC commissioned scholars to submit the “Guidelines for Underwater Archaeological Work (draft)” which was then incorporated into the permanent “Rules for the Management of Activities directed at Underwater Cultural Heritage” (Hu, 2012).

In addition to the efforts of the MOC, scholars have continued to promote relevant work in different areas and levels, such as the introduction of the UCH Convention (Hu and Wu, 2009), the organization of international conferences and visits, initiatives carrying out in the Council of Marine Affairs Advancement, Executive Yuan. The UCHPA was passed in 2015 by the Congress with several revisions. In response to the changes and a significant number of statutory authorization requirements, the MOC once again commissioned scholars a research program to draft nine
regulations or rules accordingly (Hu, 2016). The drafts were completed in 2017, and the MOC initialed them all in the same year. From the academic initiative to the full completion of the UCH legal regime, twenty years have elapsed.

III. Taiwan’s practice of incorporation of the UCH Convention

The incorporation process and the success acquired have shown some considerable signs, worthy continuing to carry out legislative policy research in the future.

First, from the legislative policy perspective, through the development of the UCHPA and its reference to other existing laws and regulations, a complete UCH legal regime was established. UCH issues involve authorities, duties, and functions of almost all agencies of the Cabinet. To effectively adapt to the inter-disciplinary and inter-agencies nature, the government incorporated the UCH Convention into the UCHPA and incorporated the contents of the Annex Rules of the UCH Convention into the subordinate ordinance authorized by the UCHPA with Taiwan’s national conditions thoroughly considered. The UCHPA apply to all UCH issues with priority. Any rules or norms in contradiction with the spirit of the UCHPA shall be amended in due course gradually in the future.

Second, national interests are the primary considerations of Taiwan’s incorporation of the UCH Convention. According to the official statements, the CAC formed its perception regarding the preservation, protection, and management of UCH based on international and domestic factors. The former is the worldwide value on the preservation and protection regarding UCH. The latter is Taiwan’s promotion and implementation of her national marine policy. The significant principles and spirits of the UCH Convention were not timely implemented in the domestic legal regime. The current law could not be fully applied to the preservation, protection, and management of UCH. The lack of norms regarding UCH resulted in the
lack of jurisdiction over the conservation of UCH. Meanwhile, nation-wide precise rules regarding UCH are absent for interest groups or stakeholders, especially the fishing and diving communities. Thus, private salvage and incidental damage are unavoidable. The lack of specific awarding incentives over UCH discoveries led to investigation difficulties.

Positively, the government assessed that although the annual required administrative costs would up to about NT$ 20 to 50 million after the adoption of the draft (UCHPA), Taiwan would be benefited from an output value conservatively estimated NT$ 120 billion each year. And it would bring other non-economic benefits or values, such as that UCH is fully protected and managed. The authority would learn more about the preservation, protection, and management of UCH. Public access would enrich social education as well. Since 2006, the CAC has been planning to promote a series of medium and long-term projects regarding UCH, including general survey, regulations research and billing, historical research, preservation of excavated UCH, personnel training, educational promotion and international cooperation. The CAC envisaged in cultivating underwater archaeology with Taiwan characteristics and developing Taiwan’s marine culture in line with the “Prosperity with the Ocean” policy.

Third, native scholars played a significant role in the legislative process. The incorporation was initiated by a small number of academics out of national interests, rule-legitimacy, and other factors. They followed and introduced the international development of the UCH issue domestically. By the cooperation with the government, internal administrative self-interpretation of the UCH Convention and awareness were raised. The academic community actively called on the Congress to pay close attention to the issue and put forward the draft respectively. Eventually,
the bill was soon adopted than expected. It is no doubt that domestic

driving force, especially elites from the academic community, influenced

more than international or external pressure.

Fourth, the incorporation of the UCH Convention is still in progress. There

are still many opportunities and challenges ahead, especially capacity

building. The preservation, protection, and management of UCH in

Taiwan involve the management of activities directed and incidentally

directed at UCH, as well as law of salvage and law of finds, territorial

sovereignty, and maritime jurisdiction disputes. These controversies

comprehend cultural (heritage), maritime law, admiralty law and other
different legal areas. The author’s drafting experiences over the past

years indicate that the preservation, protection, and management of UCH

at least comprehend half of the agencies of the Cabinet. Meanwhile, the

adoption of the UCHPA has impacted these organizations, especially their

authority, duties, and functions individually. The process of drafting the

UCHPA also showed strong cross-agency coordination and cooperation

nature. The interdisciplinary feature has made the issue more dependent

on higher and direct political support from the Cabinet itself. Before the

Cabinet are empowered directly to coordinate the issue by the UCHPA,

the MOC and even the future Marine Affairs Council (or the Ministry of

Marine Affairs) will be responsible for cross-agency cooperation and

coordination.

Apart from this, drafting the particular bill regarding UCH is one of the

priorities of the incorporation of the UCH Convention. Much of the work in

the broad sense has yet to be pursued and at the same time constitute

opportunities as well as challenges for Taiwan. International factors

played a limited role in Taiwan’s incorporation of the UCH Convention.

However, we shall never under estimate their influence. There is a great

room for Taiwan to utilize international forces aggressively. For example,
international collaboration on site excavation, information exchange, cultural diplomacy or UCH diplomacy are encouraged in accordance with the UCHPA. Disputes over maritime and UCH jurisdiction arose from the UNCLOS and the UCH Convention, coupled with the East China Sea and the South China Sea disputes as well as the potential jurisdiction overlapping over sunken military aircrafts all involve Taiwan’s major national interests. It even more provides the government with a window of opportunity to deal with the cross-Strait relations and relevant collaborations with Mainland China. To deal with the issue appropriately, the MOC would need to cooperate actively with the Ministry of Foreign Affairs, the Ministry of Defense, the Mainland Affairs Council, and other agencies.

There is a significant room for future development regarding UCH related foreign affairs. When the Congress passed the UCHPA, a resolution was accompanied by a Congress request for a written report regarding the official strategy in response to the national security need to the Education and Culture Commission of the Congress by the MOC with conciliation with the Ministry of Foreign Affairs, the Ministry of Defense and the Mainland Affairs Council. In the report replied, the MOC defined the scope of UCH related national security issue as “international information and communication security, international criminal cooperation, international information flow, international research cooperation and international exchange cooperation.” The definition reflects part of the permanent and future needs of Taiwan, showing that the government may need to offer some fresh insights into the issue to meet the national interests.

The affected interest groups or stakeholders, like fishing and diving communities, had insufficient awareness of the principles of the UCHPA and relevant regulations in the legislative process. Whether the government attains their full support remains uncertain in the future.
Public awareness regarding UCH affairs remains in the spirit of mysterious treasure hunting or legendary commercial exploitation. If the spirit of the preservation, protection, and management of UCH is to be effectively implemented, in-depth public awareness and public access will be indispensable. As a part of marine affairs, the preservation, protection, and management of UCH has a close relationship with other marine affairs and involves duties of different agencies. The implementation of the UCHPA and relevant regulations have a significant impact on those agencies, along with the relatively minor feature of the issue in Taiwan, political will would be essential. As to the judicial implementation of the UCHPA, expertise regarding cross-border cultural heritage crime investigation, return, and restitution needs to be cultivated.

Table 1: Some features of Taiwan’s incorporation of the UCH Convention.

<table>
<thead>
<tr>
<th>Level</th>
<th>Opportunity</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>The public</td>
<td>minority nature</td>
<td>1. inadequate public awareness and public access</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. minority nature</td>
</tr>
<tr>
<td>The academic community</td>
<td>1. academic enthusiasm and expertise</td>
<td>position integration</td>
</tr>
<tr>
<td></td>
<td>2. lobbying and voicing in different</td>
<td>difficulties among scholars from different fields</td>
</tr>
<tr>
<td></td>
<td>occasion</td>
<td></td>
</tr>
</tbody>
</table>
| The Cabinet | 1. major resources  
2. political will and power on inter-agency coordination and cooperation | capacity building (budget, personnel, expertise) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Congress</td>
<td>understanding and support from particular political elites with academic backgrounds</td>
<td>inadequate understanding and support from most political elites</td>
</tr>
</tbody>
</table>
| The judicial system | 1. potential to deal with the issue  
2. rule of law | capacity building (expertise, international collaboration) |

**IV. Conclusion**

The experience and observation over the past twenty years indicated that long-term internal academic concern and government efforts devoted regarding UCH legislation for national interests eventually acquired fruitful success. With coordination and cooperation among different agencies, especially the Cabinet itself and the Congress, Taiwan finished her initial legal construction regarding the preservation, protection, and management of UCH comparable to international standards.

In the future, Taiwan has a long way to go on this issue, whether she is a member of the United Nations and UNESCO or not. As an indispensable part of the world marine culture and human history, in addition to strengthening capacity building, Taiwan needs to devote more on UCH related foreign affairs, so that can properly preserve, protect, and manage
this common heritage of mankind, and ultimately achieve the universal goal of world peace.

Endnotes


2 Article 33 of the UNLCOLOS states:
1. In a zone contiguous to its territorial sea, described as the contiguous zone, the coastal State may exercise the control necessary to: (a) prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea; (b) punish infringement of the above laws and regulations committed within its territory or territorial sea.
2. The contiguous zone may not extend beyond 24 nautical miles from the baselines from which the breadth of the territorial sea is measured.

Article 303 of the UNLCOLOS states:
1. States have the duty to protect objects of an archaeological and historical nature found at sea and shall cooperate for this purpose.
2. In order to control traffic in such objects, the coastal State may, in applying article 33, presume that their removal from the seabed in the zone referred to in that article without its approval would result in an infringement within its territory or territorial sea of the laws and regulations referred to in that article.
3. Nothing in this article affects the rights of identifiable owners, the law of salvage or other rules of admiralty, or laws and practices with respect to cultural exchanges.
4. This article is without prejudice to other international agreements and rules of international law regarding the protection of objects of an archaeological and historical nature.

3 The 9th meeting record on the re-amendment regarding the amendment of the CHPA was issued by the CAC on Oct. 15, 1998, by a letter referenced as Wen-Jian-E-Tzu(文建壹字) No. 06770. It is on file with the author.

References


A Blueprint for the Conservation of Underwater Cultural Heritage in Taiwan

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Abstract

Located on an important East Asian shipping route, the island of Taiwan is surrounded by waters containing a large number of underwater artefacts as a result of weather conditions, changes in the current, submerged reefs, war and other human factors. In 2006, the Bureau of Cultural Heritage (BOCH) commissioned the Institute of History and Philology at Academia Sinica to carry out a survey of underwater cultural heritage. In the ten years since, and with the assistance of scholars from France’s DRASSM, Australia, the United States and Japan, Taiwan has made remarkable progress.

Wherever underwater archaeological sites are found, underwater artefacts are also. In the last ten years, the BOCH has recovered 1,567 items, the vast majority of which are metal and pottery. In addition, parts of wooden boats and vessels of the two World Wars and freighted goods have also been found. Because there is a lack of professional facilities and conservators, half of the recovered objects are still being stored in water.

Taiwan’s Underwater Cultural Heritage Preservation Act, promulgated on 9 December 2015, ensures the protection of Taiwan’s underwater cultural heritage. Item 6 of Article 2 of UNESCO’s 2001 Convention on the Protection of the Underwater Cultural Heritage states that “Recovered underwater cultural heritage shall be deposited, conserved and managed in a manner that ensures its long-term preservation.” In order to enhance the safety of artefacts once they are out of the water, and to provide comprehensive information about the restored artefacts, it is necessary to plan in advance and proceed carefully. In the next ten years, we need to
train more professional conservation and restoration personnel and to expand the necessary facilities into a complete system for the handling of underwater archaeology—including a series of tasks such as surveying, verification, monitoring, exploration, conservation and restoration, research, educational exhibition and promotional publication. Conserving recovered underwater artefacts is also an important task for underwater archaeology.

A complete plan is needed before undertaking an underwater archaeological project, encompassing the conservation, registration and recording of submerged objects and the restoration, research and storage of recovered objects. We need to train conservation and restoration personnel, set up conservation and restoration facilities, equipment and laboratories for recovered artefacts, and all documentation regarding underwater cultural heritage must be centrally administered and kept in good condition at the data centre. A data system should also be set up for use by researchers and the general public.

If recovered artefacts are to retain their full cultural and historical value, their conservation must be carried out by professional personnel in a way that retains all their historical information and “make the artefact talk”.

**Key words:** Underwater Archaeology, Underwater Cultural Heritage, Conservation-Restoration, Bureau of Cultural Heritage (BOCH)
1. The Importance of Recovering Underwater Artefacts

1.1 Underwater Cultural Heritage Provides Data Integral to Human History

With progress in diving technology and equipment, underwater cultural heritage has become an important type of cultural heritage, providing evidence of historical processes relating to human maritime culture and trade, oceanic migration routes and other human maritime activities. Underwater heritage sites are like time capsules, providing supplementary historical data and enriching human history. Underwater cultural heritage makes up for deficiencies in land-based cultural heritage; only together do the two types provide the full historical information on human activity.

1.2 Evidence from Historical Research

Although recovered relics can supplement or corroborate much historical information, it is only in the last 50 to 60 years that the study of underwater cultural heritage has come to be an academic discipline. Thus, many mammalian fossils have been discovered in the Penghu submarine canyon in Taiwan, including skeletons of mammoths, water buffalo, deer and horses. According to palaeontologists, these fauna fossils (known as “Taiwan Land Bridge Fauna Fossils”) prove that in antiquity the Taiwan landmass was connected to the continental landmass. Many wrecked naval vessels from the Second World War were also discovered in the Penghu sea area (such as the Guangbing gunboat), which, together with historical records and nearby lighthouses built on islands, such as the Guangbing gunboat (from the Guangdong Fleet) and (including the Gupo (Koba) Island lighthouse), constitute a complete network of underwater cultural heritage and sites. According to Japanese historical records, the Yamafuji Maru cargo ship ran aground and sank, whereas United States
records state it was sunk by torpedo. Perhaps damaged objects recovered from the area could set the record straight.

1.3 A Perfectly Preserved Time Capsule

The artefacts most likely to have retained their original appearance from the time of sinking are those that lie buried under the seabed at depths greater than 60 metres, where they are relatively undisturbed by human passage and where the environment is especially oxygen-depleted. An artefact that has sunk into the sea and remained there for a thousand years may look exactly as it did at the moment it sank, while a land-based thousand-year-old artefact may long ago have shattered and even been reduced to dust. The thousands of century-old artefacts allow us to turn back time and thus constitute an important asset for historical research.

2. Characteristics and Classification of Recovered Artefacts

2.1 Characteristics of Recovered Artefacts

Recovered underwater artefacts are different from regular land-based artefacts because they have been immersed in cold, dark, low-oxygen, salt-saturated seawater for hundreds or thousands of years. Recovery brings them into a new environment, which makes their conservation and restoration even more difficult than for land-based artefacts. Without expert treatment, when they leave their original environment and are exposed to the atmosphere, the rate of decomposition will accelerate. In order to avoid degradation and corrosion, artefacts have to be adapted to suit the surface environment, ensuring that all physical and chemical changes are gradual. Thus, immediately upon being taken from the water they are given urgent first treatment, and once they have been documented (photographed, registered, labeling) they are sent to the laboratory or conservation studio to continue the conservation and
protection work, such as desalination, cleaning(algae, molluscs, sand, chlorine), impregnation, reinforcement, drying, filling and retouching. The aim is to restore the object to its original form with minimal intervention, to preserve its integrity and make its historical value “speak” so that it can be used for research and exhibition.

2.2 Classification of Recovered Artefacts

According to the definition in Article 1 of the UNESCO Convention on the Protection of the Underwater Cultural Heritage, underwater cultural heritage consists of:

(a) “sites, structures, buildings, artefacts and human remains, together with their archaeological and natural context”

(b) “vessels, aircraft, other vehicles or any part thereof, their cargo or other contents, together with their archaeological and natural context”

(c) “objects of prehistoric character”

Objects found in ruins and towns are mainly stone sculptures, parts of buildings, artefacts and everyday items. Recovered vessels, aircraft and other means of transportation are generally made of wood or metal, while the objects that they carry are mainly pottery, porcelain, coins, stone goods, daily items and food supplies, and cannons and munitions for warships. Organic matter such as rope, sailcloth, textiles, leather and human bones can also be found.

In sum, underwater cultural heritage can be divided into three broad categories:

(1) organic matter such as bones, textiles and wood
(2) inorganic matter such as metal and pottery
(3) Composite material
The number of categories of underwater artefacts depends on the categorization of discovered underwater archaeological sites and their contents.

3. Recovered Underwater Artefacts in Taiwan

3.1 Quantities

To date, the Bureau of Cultural Heritage has overseen the recovery of 1,567 items in total: 174 in 2009, 118 in 2010, 144 in 2011, 126 in 2012, 87 in 2013, 96 in 2014, 393 in 2015 and 429 in 2016 (as shown in Table 1).

Table 1. Total recovered artefacts by year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Artefacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>98</td>
<td>174</td>
</tr>
<tr>
<td>99</td>
<td>118</td>
</tr>
<tr>
<td>100</td>
<td>144</td>
</tr>
<tr>
<td>101</td>
<td>126</td>
</tr>
<tr>
<td>102</td>
<td>87</td>
</tr>
<tr>
<td>103</td>
<td>96</td>
</tr>
<tr>
<td>104</td>
<td>393</td>
</tr>
<tr>
<td>105</td>
<td>429</td>
</tr>
</tbody>
</table>

The recovered items fall into the following categories: 946 metallic items, 15 wooden, 327 pottery, 58 seashell, 127 glass, 56 stone, 1 seed and 37 other.

In addition to the artefacts recovered during the BOCH survey, the underwater artefacts were recovered by many places:

(1) the Cultural Affairs Bureau of Yilan County government recovered
1,471,804 items at the Qiwulan site, including 946 metallic items, 15 wooden, 327 pottery, 58 seashell, 127 glass, 56 stone, 1 seed and 37 other. Organic matter such as bones, textiles and wood.

(2) In Penghu the recovery of Jiangjun No. 1 shipwreck, under the direction of the National Museum of History, 284 items were recovered in 1995-1998.

(3) The Sobraon shipwreck recovery off Matsu Island saw the discovery of X items.

3.2 Storage Sites

BOCH currently stores recovered artefacts at four locations: Taichung, Penghu, Keelung and Tainan. Many of those recovered by the Yilan County Cultural Affairs Bureau are stored in Yilan Cultural Centre. Artefacts from the Jiangjun No. 1 are stored at the National Museum of History and the Penghu County Bureau of Cultural Affairs. The Sobraon artefacts are stored on Matsu Island. (as shown in Table 2).
Table 2. Total recovered storage place.

<table>
<thead>
<tr>
<th>Site</th>
<th>Department in charge / Deposit Place</th>
<th>Quantity</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Island No.1, Guangbing gunboat, S.S. Bokhare, Masushimakan,…</td>
<td>BOCH Penghu Underwater Archaeology Work Station</td>
<td>100</td>
<td>1,022</td>
</tr>
<tr>
<td></td>
<td>The National Museum of Marine Science &amp; Technology, Keelung</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cultural Heritage Research Center, Tainan</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Qiwulan Site</td>
<td>Yilan County Bureau of Cultural Affairs</td>
<td>1,151,066</td>
<td>Before the setting up of the Underwater Cultural Heritage Section at BOCH</td>
</tr>
<tr>
<td>Jiangjun No. 1</td>
<td>Penghu County Bureau of Cultural Affairs</td>
<td>284</td>
<td></td>
</tr>
<tr>
<td>Sobraon</td>
<td>Cultural Affairs department of Lienchiang County Government. Matsu</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

In its earlier development in Taiwan, underwater archaeology was understaffed, with a relative lack of manpower and technical ability for the conservation and restoration of recovered artefacts. Thus, the first batch of artefacts salvaged from Jiangjun No. 1 did not go through each and every part of the conservation process: 794 items of the underwater artefacts recovered by BOCH are still being stored in water. approx. 51% have yet to be processed. Of the 1,473,655 items recovered in Taiwan, most of them have yet to be processed.

3.3 Efforts to protect underwater cultural heritage

On 10 December 2015, Taiwan passed the Underwater Cultural Heritage Preservation Act, which laid the optimal groundwork to guarantee conservation of Taiwan’s underwater cultural heritage. To bolster the
security of recovered artefacts, BOCH has set up an index to record their information and is organizing a storage/exhibition space and professional training in conservation workshops. This will preserve for posterity the historical data of these recovered remnants and fully realize their great historical value.

3.3.1 Staff Training and Workshops

In August 2015, BOCH invited two scholars, Australia’s Mark Staniforth and Japan’s Jun Kimura, to come to Taiwan and share their expertise with the Taiwan Underwater Archaeology Team. From 2 to 12 October 2016, Australians Andrew Viduka and Jon Carpenter ran a study workshop on on-site processing of underwater artefacts (metal and wood). In collaboration with Academia Sinica’s underwater archaeology team, BOCH carried out the Taiwan Coastal Waters Underwater Cultural Heritage Survey Project and trained front-line staff at the site of the Green Island No. 1 shipwreck in the waters off Green Island to correctly handle recovered artefacts and follow the right workflow. The training gave personnel a good grasp of the knowledge and skills needed to carry out on-site conservation and protection of recovered artefacts and work management. It also helps improve the process of conserving and managing recovered underwater cultural heritage.

3.3.2 Taking Inventory and Building a Database

In 2015 and 2016, an inventory of recovered artefacts was carried out and a data registration form was drawn up in the hope of gathering the scattered information about recovered objects into one place, ultimately to be entered into a forthcoming database.

3.3.3 Setting Up the Penghu Work Station
In 2014, BOCH signed a contract with Chunghwa Telecom to turn the historic Penghu Post Office and the telecommunications bureau dormitory on its east side into a national underwater archaeology work station, combining data resources and equipment for the use of the underwater archaeology workforce as a work and exhibition space. By May 2015, the renovation was complete, a reuse survey had been carried out and a plan had been drawn up to finish the work by February 2018. The historic post office building was chosen to act as an exhibition space, and the underwater archaeology work station would be moved to the former site of the telecommunications bureau dormitory. A research area, storage area, car park, preparation zone, cleaning zone and dormitory have been planned.

3.3.4 Setting Up a Collection Space for Recovered Artefacts

BOCH will set up a collection space on the fourth floor of the Weishui Building at our Taichung office’s to be used as an initial repository for underwater artefacts recovered by the future underwater archaeology research centre. The space is approximately 90 m2 and able to house around 24,000,000 m3 of recovered artefacts. Detailed plans have already been drawn up, and construction is due to be complete before the end of the year.

4. Recommendations

4.1 Train conservation and restoration personnel

The lack of professional staff is why the majority of recovered underwater artefacts continue to be stored in water and also one reason why Taiwan is not doing its utmost to recover objects. Of course, if the necessary skills to treat recovered artefacts are lacking, recovery is the wrong course of action, but it is also poor policy not to salvage important underwater
artefacts that are of historical value or that lie in an inhospitable environment simply because of a lack of professional restoration staff. In this way, the laborious work of surveying and identifying underwater cultural heritage has all been in vain, and the hard-won discovery of underwater archaeological sites will not lead to any further research. After surveying, checking, rechecking and confirming underwater archaeological sites, if they contain objects that fill in gaps in human history, recovery should be under consideration. But in order to resolve this problem, we must immediately start training conservation and restoration personnel, perhaps by inviting international scholars to Taiwan on a yearly basis to give courses on metal, pottery, wooden and other organic materials, so that staff can earn course credits or certificates on the treatment of recovered artefacts.

Training of underwater cultural heritage conservation staff could start with those who have a Master’s degree or higher in cultural heritage, art culture, artefact conservation or other fields relating to conservation techniques. They should be encouraged to gain qualifications in underwater cultural heritage conservation, protection or management, either in Taiwan or abroad.

4.2 Expand the size of underwater archaeological work station

The Penghu underwater archaeology work station is located opposite Makung Harbour. The Penghu site has a high number of wrecks, so it is the ideal location for the work station, but it currently measures only 633.54 m2. Discounting the Penghu Post Office exhibition space, the telecommunications bureau dormitory has to provide space for underwater archaeology personnel and diving-related facilities such as divers’ sleeping quarters and office space, diving tank recharge area, shower area, drying room for diving suits, storeroom, a room for various
marine survey equipment, car park and corridors. If an emergency room for treating recovered underwater artefacts is to be set up, it will be rather cramped. In the event that a large volume of objects is recovered, a certain amount of space will be necessary for their treatment, so it will be necessary to find a bigger space in Penghu. Other underwater archaeological sites such as Green Island, should evaluate its quantities of underwater cultural heritage.

4.3 Integrate the data and management of all underwater artefacts in Taiwan

Information regarding the underwater artefacts at Yilan’s Qiwulan site (more than 10,000) the Jiangjun No. 1 wreck in 1995 (over 200), and the Matsu Sobraon wreck (25), which were all recovered before the passing of the Underwater Cultural Heritage Preservation Act, should be integrated and managed centrally.

4.4 Set up first-rate restoration laboratories in work stations

Recovered underwater artefacts are vastly different from regular land-based artefacts. The former requires immediate appropriate treatment, so the more underwater sites an area has, the more first-rate restoration and testing spaces are needed. A properly equipped facility can be used to give recovered artefacts the care they need. By restoring and preserving an artefact’s original shape and appearance, we can preserve its original historical data, to be studied by historians and exhibited for the public, and everyone can get a closer look at precious underwater cultural artefacts that would otherwise be out of reach.

The size of the conservation room determines the size of the artefact that can be treated. Because artefacts require desalination, impregnation, and chemical substitution, we must install large tanks for water or solvents or
electrolysis tanks. These are extremely heavy and must be installed on the ground floor to make it easier to unload artefacts and avoid concerns about overloading the floor.

4.5 **Set up an underwater archaeology data centre**

According to Rule 33 of the UNESCO Convention on the Protection of the Underwater Cultural Heritage, “The project archives, including any underwater cultural heritage removed and a copy of all supporting documentation shall, as far as possible, be kept together and intact as a collection in a manner that is available for professional and public access as well as for the curation of the archives.”

Since the promulgation of the Underwater Cultural Heritage Preservation Act in Taiwan, BOCH, Ministry of Culture is the only government administrative body to have jurisdiction over underwater cultural heritage. Although Taiwan has only been undertaking underwater cultural heritage work for ten years, the annual surveys and related research data should be systematically collected and stored centrally as soon as possible. An underwater archaeology centre should also be set up with the goal of assembling all the data for the use of researchers and the general public.

4.6 **Underwater excavation work only to be carried out by trained conservation and restoration personnel**

According to Article 35 of Taiwan’s Underwater Cultural Heritage Preservation Act, when artefacts are excavated a plan must be drawn up for their conservation and protection. Emergency treatment must be carried out by professionals of underwater archaeology, underwater work and conservation.
During assessment of artefact recovery, professional restoration personnel must be brought in in order to understand the degree of risk artefacts face in their environment and situation and so better prepare for recovery. For example, should the artefact be recovered by hand, by wrapping it up, or using a bag or a hook? On the day of recovery, the professional conservation personnel should be onboard the work boat to handle, labelling and clean the items or give urgent attention to more fragile items. Some excavation sites are remote, and excavation may take several days or weeks, in which case a temporary work station should be set up on shore. If the quantity of objects is very large, it will be necessary to consider setting up a formal work station, where personnel, apparatus and all the main facilities can be stationed.

5. Conclusions

The waters around Taiwan are teeming with historical maritime culture. It is estimated that just over 99% of our underwater cultural heritage still lies on the seabed, waiting to be uncovered. Underwater archaeology has developed late in Taiwan and still faces serious challenges. It needs the support of government policy and an influx of fresh young talent. Recovered artefacts need to be dealt with carefully, with advance planning. Item 6, Article 2 of the UNESCO Convention on the Protection of the Underwater Cultural Heritage states that “Recovered underwater cultural heritage shall be deposited, conserved and managed in a manner that ensures its long-term preservation.” It is impossible to store recovered artefacts in water tanks forever—they will still decompose. But while we cannot allow over half of our recovered artefacts to continue to be stored in water, nor can we leave them unrecovered simply because we lack storage locations or trained personnel, i.e. preserving the status quo by using “in-situ preservation”. 
Henceforth, the most important criterion for conservation and protection personnel is professional qualification, which means we need to start training people straightaway. We need to work closely with professional personnel when setting up laboratories and conservation facilities. Surveying, verification, exploration, conservation and restoration, research, educational exhibition and promotional publication are all tasks for underwater archaeology. We must not merely work on the initial stages and then ignore the subsequent conservation and restoration of recovered artefacts. Rather, we have to look at it as a whole process and take each task to completion. With the right restoration and testing space and the right equipment and tools, we can give recovered underwater artefacts the attention they require, restoring and preserving their original shape and appearance. In this way, we can preserve the entirety of these items’ historical data, so historians can study them, the public can see them in exhibition and everyone can get a closer look at precious underwater cultural artefacts that would otherwise remain out of reach.
**Session 8: Management of Underwater Cultural Heritage Sites and Conservation of Wet Archaeological Materials**

This session will focus on in-situ preservation and conservation management issues, conservation analyses and treatments, and applied conservation research of archaeological materials from underwater cultural heritage sites. The main purpose of this session is to encourage the exchange of ideas and practices as well as to encourage the development of conservation networks throughout the Asia-Pacific region. Presentations, posters and workshops are invited that address any of the following areas:

- In situ preservation of underwater cultural heritage sites, including reburial practices
- Conservation management of underwater cultural heritage sites, including on-site monitoring
- Conservation treatment case studies
- Research into the analysis and treatment of wet archaeological materials
- Review of the status of wet archaeological conservation programs in the Asia Pacific region
- Development of collaborative conservation research and treatment programs

**Session Chairs:**  
Ms. Vicki Richards  
Mr. Jon Carpenter  
Ms. Mi Young Cha
Conservation of Artefacts from the Pearl Shell Fleet
Mothership - Sanyo Maru 1937

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Abstract

During November 2016 an expedition to the Arafura Sea, led by Maritime Archaeologist David Steinberg (Heritage Branch, Department of Tourism and Culture, Northern Territory, Australia) recovered a number of artefacts from the wreck of the Sanyo Maru a mothership for the Japanese pearl shell fleet. After 78 years underwater the steel-built vessel, resting upright, still retained substantial structural integrity. The dive team investigated the stern-half of the ship penetrating the main deck house via original access-ways. The steel-framed structure still enclosed the space but the intervening plating was mostly absent due to corrosion. Cabin walls were also missing. Despite the relatively open environment a surprising number and type of artefacts remained in a good state of preservation, particularly ceramic items and glass bottles (two sealed with original contents). In terms of organic materials two perfectly intact lacquerware bowls and a quantity of chopsticks were recovered. Metal objects recovered vary in condition the extent of corrosion mainly a consequence of galvanic reactions. This paper explains the preparations to manage the artefact materials from the conservation perspective, photographic recording, cleaning and packing in the field situation and laboratory conservation treatments.

Key words: Japan, Conservation, organics, shipwreck

Historical Background

The Sanyo Maru was built in 1935 in Osaka, Japan. It was purpose-built to function as a mother-ship to a pearling lugger fleet. Estimates at the time of the vessel's loss suggest the ship serviced approximately 30
pearling luggers. In 1937, the year the *Sanyo Maru* sank, the Japanese fleet gathered some 3,300 tons of pearl shell from the Arafura Sea. At the time Japanese pearlers accounted for 50% of the world trade. The ships would gather at a designated Japanese anchorage located outside Australian territorial waters. The *Sanyo Maru* was anchored here on the day it foundered in a squall and sank, two of the men aboard died. The vessel sank with a large catch of pearl shell. In addition to a principal cargo of shell, accounts by newspaper journalists of the time, describe the mother-ships as ‘floating emporiums’, providing a range of goods to the men in the fleets who were isolated in foreign seas for months at a time (Steinberg, 2016).

**The Sinking of the Sanyo Maru**

On 1 July 1937 the *Sanyo Maru* had approximately 20 men aboard. This constituted its large crew and also one or two injured divers (Courier Mail 10/7/1937). It was also widely reported to have been heavily overloaded with cargo. The main cargo hold, found to be completely empty during inspection of the wreck site in 2012, was likely filled with bags of pearl shell when it sank but it is known that salvage work took place soon after the vessel’s loss. An unseasonal squall had hit the fleet and rather than seek sheltered waters along the coast, the master turned the vessel and headed seaward. The *Sanyo Maru* reportedly ‘rolled’ twice and then ‘foundered’; meaning it sank by taking in water. There was not sufficient time to launch the vessel’s powerboat but some aboard got away in a dinghy and others clung to floating debris. Survivors were picked up by other boats, although they did spend some time in the water before being located. The two that died in the sinking were an injured diver, who was to be transported to Palau, and the ship’s purser, who was in charge of money, food and supplies (Steinberg, 2016).
Archaeological Project Background

The *Sanyo Maru* shipwreck site was located in 2001 by the Royal Australian Navy during coastal mapping activities, its identity was confirmed in 2002, and inspected without intervention or artefact recovery in 2012. Limited excavation, including selective artefact recovery, was conducted in November 2016 by a team of maritime archaeologists under the direction of David Steinberg (Senior Heritage Officer, Heritage Branch, Department of Tourism and Culture, Northern Territory, Australia).

Materials Conservation

From the outset of the proposed expedition to recover artefacts from the *Sanyo Maru* consultation with respect to conservation care, management and eventual treatment of the artefact materials was understood to be an important and primary consideration. A conservator from the Department of Materials Conservation (DMC), Western Australian Museum (WAM) was contracted by David Steinberg to provide conservation support for an expedition to recover a range of selected artefacts, mainly ceramics, but based on the 2012 inspection of the site also specific artefacts seen at that time. Conservation treatment for the artefacts would also be undertaken at the DMC.

During the 2016 expedition some of the artefacts originally seen in 2012 could not be located again. The wreck site is known to be subject to strong tidal currents and since it has become an artificial reef it also attracts fish-life, notably carpet sharks (Wobbegongs) that have the habit of settling on the vessel, including the area inside the stern planned for excavation. Both factors could have resulted in the artefacts being moved, buried or even destroyed. Prior to diving it was recognised that other potential artefact disturbing factors would be the water dredge excavation device, that will
rest on the seabed, and the trailing bundle of surface supply lines, comprising combined tether, airline, video and communications cables, the divers would use. The situation was appropriately managed by the buddy diver always tending the excavating diver’s line and ensuring their own line, and dredge exhaust pipe, remained out of the way and over the side of the wreck.

**Conservation information and communication prior to the expedition**

Prior to the expedition the principal archaeologist, Steinberg, advised the primary aim was to remove a relatively thin layer of sand and silt from the surface of a representative area of the wreck, record in detail the material in-situ and then conduct a limited excavation to recover a sample of artefacts. The main type of artefacts designated for recovery was planned to be ceramic material. It was obviously important to know this in order to ensure the conservation materials and equipment taken into the field would be appropriate and in sufficient quantity. However based on the intended recovery of artefacts previously seen (2012) it was already known that other material types would be raised. The range and quantity of conservation supplies, to a reasonable extent, should always exceed the proposed expedition requirements as invariably decisions about what is recovered change and the conservator will need to deal with unanticipated artefacts/materials. The isolated wreck site location of the *Sanyo Maru* and the lack of coastal townships would not permit any suitably close access to conservation supplies ashore.

**The conservator’s role during the expedition**

For this expedition it was not planned for the conservator to be one of the divers. Whilst this would have been directly beneficial for assessing the
condition of artefact materials, and perhaps thereby influencing selection, the conservator was still able to observe the divers viewpoint via live video and communicate with them should either have questions.

An in-situ conservation survey of the wreck site, including the acquisition of corrosion data, to be performed by diving conservators, had also been considered for the 2016 visit to the Sanyo Maru but could not be conducted during this expedition due to time constraints and the priority of other aims. Also the more practical and preferred method of untethered diving (SCUBA) to conduct the survey was not to be utilized. The opportunity to conduct a conservation survey may yet take place at a future time.

As stated the conservator’s principal role, during the Sanyo Maru expedition was to manage and care for the artefact materials. The divers also needed to be aware that conservation considerations, for them, begin during excavation procedures in order to avoid further damage to the deteriorated and potentially fragile artefact materials. The conservator’s preparations for the divers initially involved provision of suitable containers, bags and wrapping materials secured in a crate that would be readily accessible on the wreck site, thus avoiding any need to return to the surface during the dive. Advice was available to divers regarding handling and packing of specific artefacts when performing these procedures underwater. It was important that the organic materials, which are more vulnerable to collapse, retain the support of water at all times and this was maintained by placing them in clear plastic containers with locking lids. See-through containers are preferred as the type of object and nature of the housed artefact/material is always apparent to the handler. The lids of each container were tied-on with fishing line and a lead fishing weight secured to the line in order to prevent the containers
from drifting away when the lid of the holding crate was opened. Similarly polythene bags were secured to the crate with a cable tie passed through a hole in the top corner of each bag so each individual bag could be pulled off without releasing the others (Fig. 1). Once excavated the containerized artefacts were raised in an open mesh crate located inside a metal cage attached to a winch. Placed on the deck of the workboat the artefacts were first accessed by the conservator, removed from the recovery containers, when appropriate, and placed in larger containers filled with seawater. From here each artefact in turn was photographed (Fig. 2).

Fig. 1: Artefact holding crate (lid opened) shortly after recovery. Plastic food boxes and polythene bags (secured with cable ties). Diver receives a dish for packing (inset LH). A porcelain dish as raised from the wreck site (inset RH).
**Conservation preparations and advice**

As the option of a land-based conservation facility was not possible or practicable there would consequently be inherent risks to the artefacts when working with them on a work platform that is subject to movement of the sea, particularly if stormy conditions develop. To contend with the possibility of poor sea conditions it was recommended that the main conservation work table have a raised edge to its perimeter in order to prevent any containerized artefacts from sliding off if the workboat rolled and pitched. Rather than construct a purpose-built table it was proposed that a simple wood frame be fitted that drops onto and fits around the table edge. Sea conditions during the 2016 expedition to the *Sanyo Maru* were always relatively calm, as the suggested frame for the table was omitted.
this was fortunate. In conjunction with the frame safety barrier small linen sand bags were intended to be used to bed-down and stabilize artefacts. Obviously if there had been an impending change to worsening sea conditions artefacts would have been placed on the deck in containers filled to the brim with seawater and secured with lids to minimise object movement.

Knowing that ceramics would be the main type of object recovered particular consideration was given to the packing of these objects for the return seaward journey and then via road transport to the conservation laboratory at Fremantle in Western Australia. To keep individual items separated, but allow them to be packed together and kept wet, relatively thin (5mm) sponge material was chosen. Normally used in the home the packs of inexpensive synthetic sponges were of convenient size (180mm x 180mm), the only potential concern being colour fastness of the product. To confirm that colour transfer would be an unlikely issue (considering it would be undesirable for dye transfer to occur during conventional use) the sponge was tested prior to the field work by saturating it in seawater and with a wad of similarly saturated blotting paper (as a substitute and more receptive to staining than ceramic is anticipated to be) was inserted into a self- sealing polyethylene bag. Seawater was used for the test as the recovered ceramic would not be immersed in any fresh water to avoid potential issues with osmotic shock. After one month, the test revealed no dye transfer. Subsequently the sponges were used for packing, mainly ceramic objects (Fig. 5). Another, worthy addition to the equipment supplies was a rotating platform (Lazy Susan). Originally intended to be used to facilitate the easy acquisition of multiple images of artefacts for 3D rendition the platform was found to be very useful as an aid to removal
of marine growth from the artefacts. Essentially minimising handling by avoiding the need to reposition the artefact during the process (Fig. 4).

**List of Conservation Field Supplies - Sanyo Maru Expedition**

**Artefact First Aid, Registration and Recording**

Container (large) to keep objects held in excavation crates wet on the surface

Nally tubs to store wet objects post recording

Assorted food storage containers (lock-down lid)

Dedicated camera

Photo Scales

Table x 1 (1.8 m long)

Object recording sheets (and folder)

Photo back drop cloth

Spray bottles (to keep objects wet)

Assorted paint and old tooth brushes

Dental picks, Tweezers & Scissors

Scalpel handles and blades

Sample vials

Cotton buds

Nitrile gloves

pH paper

Deionised water (20 litres)

Permanent marker pens

Magnifying glass

Aluminium foil

Buckets with lids x 2

Torch & personal head-light

Tyvec (for labels)
**Packing Artefacts for Transport and Conservation**

*Nally* Tubs (68 L) with lids initial wet storage then artefact packing (x10)
Absorbent cloths and sponges (*Chux* and *Mr Clean Super Thirsty*)
Self-sealing zip lock bags for objects (assorted sizes)
Wetting agent (water crystals *Eden*)
Foam mesh (fruit protective packing)
Bubble wrap (medium)
Cling wrap
Foam padding for lining transportation (*Nally*) tubs
Hessian cloth - padding in excavation and storage
Polythene sheet (roll of builder’s film)

**Artefact Reburial Materials**

Reburial (*Nally*) tubs (5)
Clean white sand (in bags)
Cable ties (strong - assorted sizes)
Probe (seabed – sand depth)
Geotextile Fabric 1.2m x 10m Non-woven Handy Roll
Cattle ear tags (50mm)
Shade cloth mesh (70%)

**Miscellaneous**

Lead weights to hold down underwater crates
Lead fishing weights (to prevent small artefact containers floating away)
Electrical tape (red/black)
Gaffe tape
Lug crates and lids (free-draining) x3
Flagging tape (for artefact flagging and ID numbers)
**Conservation Photography**

Conservation photography importantly establishes and maintains a record of artefact appearance and provides a visible means of condition assessment at the time of recovery and throughout treatment. During the expedition images were also acquired of the conservation facilities, activities and processes to aid information dissemination via future publication, conference presentation and teaching. The artefacts were photographed in their as-recovered condition. Artefacts that required the removal of marine fouling organisms were also photographed during this process and on completion. A simple appropriately coloured backdrop for some of the artefacts was a dark blue T-shirt, pre-saturated with water to help maintain wet conditions for the artefacts and avoid the distracting water marks that would be derived from the still wet artefacts and the water spray used to ensure they remained wet during the photography procedures (Fig.2). A waterproof plastic scale recorded artefact dimensions.

**Artefact Conservation Procedures Performed in the Field**

Conservation procedures in the field are generally limited by the lack of laboratory facilities, chemicals and equipment. During the *Sanyo Maru* expedition only some of the marine encrustation was removed from the artefacts and particularly, where present, marine fouling organisms. This is necessary as the death of any of the biota creates a bad odour, and more concerning, releases detrimental products of decay that can damage artefact materials. To contend with this during the short period of initial storage, contaminated seawater was promptly replaced. The artefacts that required more extensive surface cleaning, and also exhibited a significant change in appearance afterwards, were re-photographed during and after the work was completed. At this stage the
artefacts were tentatively identified by an archaeologist, registered and in collaboration with the conservator (in terms of access and handling), a registration number allocated to each. Numbers were simply written with a black permanent marker on pre-cut strips of white Tyvek material (pre-tested, prior to the expedition, to ensure material durability and ink fastness in seawater).

Reburial of the Excavated Areas

The excavations in the stern area resulted in the removal of dead bivalves, mollusc shell, sand, mud-like deposits and some artefacts. This created some hollows and shallow depressions in the relatively thin deposition layer (approximately 300 mm). To protect and eventually re-establish prevailing environmental conditions (or potentially improve them) exposed deck surfaces and artefact materials, to remain in-situ, were reburied. The conservation procedure carried out was to firstly position a layer of geotextile into the excavated area then clean sterile sand was poured, from bags, over the geotextile to refill the area. Shade cloth (70% UV-appropriate mesh size) was laid over the bed of introduced sand and then a single layer of durable polymeric sand bags was placed on top to physically secure the conservation materials and underlying cultural material. The fill materials would also define the disturbed area for any future research. The protective layers applied to the excavated area will retard sand movement and inhibit potential disturbance by the activities of carpet sharks. Importantly the layers of materials used will facilitate the establishment of anaerobic burial conditions that are more conducive to artefact preservation.

Proposed Reburial of Some of the Artefacts
To limit the number of artefacts recovered and therefore the extent and cost of conservation it was originally planned to rebury some of the recovered artefacts, after examination and photographic recording, etc. The reburial preservation strategy was to wrap them in geotextile (with an identification number) and place them inside a durable plastic (HDPE) 68 L container (Nally), secured with a lid. Objects of the same material type would be packed together, the container(s) then filled with sterile sand (pre-purchased in bags) that would provide both support for the artefacts and importantly shorten the time it would normally take to establish the preferred anaerobic micro-environment for them. If simply reburied in the actual seabed establishment of this desired micro-environment is expected to take longer and the consequences of natural disturbance processes obviously more probable. After securing the lids the filled containers would be loaded into the winch cage and lowered to the seafloor. The tubs would then be placed in a pre-excavated trench and backfilled with seabed sediment using the excavation dredge. The proposal was to bury the container of artefacts in the seabed near the wreck site and record its position. Concerns would be the potential impact of future collapse of the Sanyo Maru. A similar consequence would also occur if the container of artefacts had, as was considered, been located inside the vessel (the hold for example). This would also have made it easier for potential looters to find and remove the artefacts.

The outlined reburial procedure was not utilised as the principal archaeologist decided, in consultation with the conservator, that all recovered artefacts would be retained and conserved.

**Departing the Wreck Site**

Prior to the work boat leaving the Sanyo Maru wreck site all recovered artefacts were packed to avoid the greater potential for damage while the
vessel was underway. To ensure the artefact materials did not dry out seawater saturated materials were utilised rather than the water by itself. Generally it is impractical to transport artefacts submerged in water, it contributes weight and can cause a destructive slopping motion if containers are not filled to capacity (or leak) and secured tightly with a lid. Saturated sponge and cloth materials were principally utilised for inorganic materials and a water-based gel media for organic materials. The gel (*Eden* water storage crystals) was particularly useful and effective for packing extremely fragile lacquerware bowls recovered from the wreck site (Fig. 3). To facilitate its eventual removal from the lacquered surfaces direct contact with the gel was avoided by firstly covering the surfaces with patches of wet cloth. Artefacts wrapped in saturated materials were either made water-tight with sealable polythene bags or plastic boxes where appropriate. Glass and ceramic bottles were also provided with expanded polystyrene mesh covers (foam mesh used to protect fruit) for additional protection. Two of the larger objects recovered, a ‘Sake’ container and ships lantern, remained submerged in individual close-fitting tubs of seawater, filled to the brim and secured with lids as they would be repacked prior to leaving Darwin for Fremantle in Western Australia.
Fig. 3: Lacquerware bowls being unpacked from transit storage using a water-based gel media. Direct contact with the gel was avoided to facilitate its removal. Lower image shows bowl after final rinse with freshwater.

Post-Expedition Publicity and Conservation

On arrival in Darwin the news media had been invited to view a limited number of artefacts and interview the principal archaeologist and conservator. Although undesirable in conservation terms, a conservator, inevitably, is expected to unpack some artefacts for this purpose. The sponsor who provided the workboat, Nalena Bay, heads of departments and a government minister were also keen to view them. A spray bottle of seawater was utilised to ensure the artefacts did not dry during the viewing. Afterwards the artefacts were rewrapped and returned to their respective holding tubs. As a general comment, about these situations, anticipate reporters will not always use the correct terminology, are quite likely to misquote you and over-simplify your comments.

Final Packing Advice for Delivery of Artefacts to the Conservation Laboratory

As the conservator was unavoidably returning promptly to Western Australia final packing for transportation of the artefacts was undertaken in Darwin. Ideally this should be the responsibility of the conservator
however under the circumstances packing advice was provided to the archaeologist concerned. The interior base of the plastic transportation tubs were padded with foam matting and artefacts provided with additional padding protection utilising bubble wrap and sheets of pliable foam. The large ‘Sake’ container and ships lantern were removed from seawater storage and wrapped in layers of seawater saturated cloth (geotextile), made watertight with layers of plastic cling film, and placed in their respective tubs with additional padding as described. (Note, there was still some residual kerosene in the seawater remaining in the lanterns fuel container. Draining this was contemplated but under the circumstances it was not considered a hazard with everything remaining wet and watertight by wrapping them with layers of cling wrap).

For the smaller artefacts, the transportation tubs were again lined with foam (interlocking floor matting). Ceramics were packaged with seawater saturated sponge, double bagged and each was adhesive taped to form a secure parcel. Where possible these were also packed into plastic boxes. Heavier objects in plastic boxes were placed on the bottom and those in smaller containers placed above. Padded glass bottles, including the two with original contents, (tops sealed with a finger cut from a nitrile glove and secured with electrical insulating tape) were placed on their sides. Bubble wrap was used to fill any voids and cushion objects. The large decorative bowl (SM065) was wrapped in seawater saturated geotextile and packed into the larger ceramic wash basin (SM066). Each bowl was double bagged individually. The package was positioned bowl up-right in a transportation tub with resilient packing materials filling the surrounding voids. FRAGILE and GLASS labels were attached to the tubs and lids secured with cable ties. Tubs were dispatched via road transport as soon as possible.
Conservation Treatment Procedures (to date)

In the field all recovered artefacts were stored in seawater. On arrival at the WA Museum conservation laboratory all ceramic artefacts were initially soaked in a 50/50 solution of seawater/tap-water (2 weeks) to minimise any potential glaze damage due to osmotic shock.

**The Large ‘Sake’ Container**

The ceramic container (SM046), possibly for Sake, is now desalinating in tap-water (Fig. 4). The many, small, residual calcareous deposits that were still attached to the glazed surface after cleaning in the field, have been carefully detached with a scalpel blade. Following desalination in tap water, then deionized water, the jar will be allowed to dry.

![Image of the large 'Sake' container before and after removal of encrusting marine fouling organisms.](image)

**Fig. 4:** The large ‘Sake’ container before and after removal of encrusting marine fouling organisms.
**Large Decorative Porcelain Bowl**

In the field the largest porcelain bowl (SM065) was cleaned to remove a film of fouling organisms and bivalve mollusc shells and stored submerged in seawater (Fig. 5). After removal of the shells the glazed surface of the ceramic, in former contact, was blackened due to the anaerobic micro-environment that had prevailed underneath. On exposure to fresh aerated seawater these stained areas oxidised to a light rust colour. If the stains persist removal is proposed by initially swabbing with an oxalic acid solution. Desalination will initially be performed in tap water, completed with deionized water, and the bowl allowed to dry.

![Image of porcelain bowl with cleaning process](image)

*Fig. 5: Removing an organic film of marine growth from the largest porcelain bowl. The interior of the bowl after similar cleaning (inset).*

**Wash Basin**

The ceramic wash basin (SM066) has a copper alloy drain fitting. In the field the fitting was carefully wrapped and the drain hole filled with water saturated sponge material and securely wrapped with electrical insulating
tape (Fig. 6). At present the basin is soaking in tap water and will be transferred to deionised water to complete desalination. The drain fitting will be assessed to determine if it can be temporarily removed for individual treatment with citric acid/thiourea and/or by chemical reduction using alkaline dithionite.

**Fig 5:** Method of using, seawater saturated, sponge padding to protect porcelain cups and maintain appropriate conditions for travel. External surfaces were similarly packed and enclosed in self-sealing polythene bags.

**Smaller Ceramics**

In the field the range of smaller ceramics (dishes and cups) were cleaned, after being photographed, to remove muddy deposits and small fouling organisms and then stored submerged in seawater. On arrival at the WA
Museum conservation laboratory the ceramic artefacts were initially soaked in a 50/50 solution of seawater/tap water (2 weeks) to minimise any potential glaze damage due to osmotic shock. At present the ceramics are soaking in tap water and will be transferred to deionised water to complete desalination. The ceramics will then be allowed to dry.

**Glass**

All glass bottles, a glass stopper and fragments of glass from the ships lantern (SM067) are currently undergoing desalination in tap water to be followed by deionized water and allowed to dry.

**Glass Containers with Stoppers and/or Original Content**

Samples will be taken from the two bottles. The glass container (SM071) appears to contain the remains of a black ink. The bottle SM073 has a ground glass stopper, (suggesting a medical/chemists solution), which has proven at this stage difficult to remove.

**Wood Artefacts**

Chopsticks, wood samples and a plant seed (possibly a palm nut) SM053 are presently held in tap water and will be undergoing conservation treatment with Polyethylene Glycol (PEG).

**Lacquerware**

Research is being undertaken to ascertain the best treatment for the lacquered wood bowls. Presently the bowls are stored in tap water.

**Other Organic Objects**

The material used to make a toothbrush handle (minus bristles) (SM051) has yet to be identified before a treatment process is initiated. It appears to be made of horn.
**Copper Alloy Artefacts**

Metal artefacts were initially stored in tap water or 2% sodium carbonate solution where iron fittings are present. Small copper alloy artefacts were initially treated by the citric acid/thiourea process to remove corrosion products followed by chemical reduction in an alkaline dithionite solution to complete extraction of chloride.

**Ship’s Lantern**

The lantern (SM 067) appeared to have arrived at the conservation lab intact however it was discovered, after it was unwrapped, that the top section had cracked and separated due to the extent of corrosion, no metal having survived in this upper structure. Although not a desirable occurrence it does permit easier access to the lamp interior for treatment purposes. At this stage it is anticipated that restoration should be possible. The lantern is currently stored in tap water, pending a full condition assessment. The copper alloy material used to fabricate the artefact has corroded to a variable extent and consequently it is most likely that calcareous accretions will need to be retained to maintain structural integrity.

**Bivalve Molluscs**

A living pearl oyster shell (SM077) was de-fleshed and is undergoing desalination in tap water. Bivalve molluscs removed from the large decorative bowl (SM065) for possible reattachment (for exhibition purposes), are also desalinating in tap water.

**Medical Kit (?)**

A copper alloy box (SM002), was investigated in the field to ascertain what it contained and how vulnerable the contents would be during storage and
travel to the conservation laboratory. The box could only be partly opened, sufficient to peer inside as movement of the hinged lid was restricted by corrosion products. Ideally a portable x-ray unit would have been the best option to reveal the contents. Using a torch light a set of instruments could be seen, including a pair of scissors. The contents were not loose instead secured in retaining clips/slots and therefore deemed relatively safe to travel with the box kept wrapped in saturated sponge material and sealed in a plastic box. On arrival at the Conservation laboratory the kit was initially stored in a 2% solution of sodium carbonate to minimise further corrosion of the ferrous metal scissors, and scalpel blades. The box hinge has not been moveable therefore the small amount of residual solder holding the separately attached hinge plate was melted with minimum heat (mini blowtorch) and the lid removed in order to access to the individual instruments. The box, two tweezers and an unidentified probe-like instrument have been treated by chemical reduction using alkaline dithionite and are presently rinsing in deionised water. The scissors have been desalinated and consist of corrosion products only presently the fragile condition has resulted in them becoming separated into a number of pieces that will require bonding together.

**Conclusion**

A limited but varied and interesting collection of artefacts have been recovered from the *Sanyo Maru*. Most are a collection of everyday items that differ in material type and condition sufficient to afford some additional challenges to standard conservation treatments. The ships lantern will require quite extensive restoration and where possible smaller metal artefacts will be separated into their component parts to restore function, the threaded nuts of diver airline connectors, a door hinge and a door catch for example. Overall treatment time is anticipated to be around two
years for completion of the artefact conservation, dictated by the longer wood PEG impregnation process followed by controlled freeze drying. Less time consuming treatment processes will result in a progressive and staged completion of the other artefact materials.

References


Biography

Jon Carpenter is a Maritime Archaeological Conservator at the Western Australian Museum. As a diver he conducts pre-disturbance surveys and records corrosion data from underwater sites. Conservation support is provided with respect to recovery, stabilisation and safe packing of artefacts in preparation for transportation to the Western Australian Museum Materials Conservation Laboratory. Conserving principally iron objects Jon has treated cannon and anchors from several shipwrecks including the *Trial 1622* - the earliest known shipwreck in Australia and carronades from HMS *Sirius* - the Principal Escort of the First Fleet 1788. Overseas, Jon has worked in the Indo-Asia-Pacific region, Arabia, South Africa and the Caribbean. More recently his expertise and knowledge has been utilized in teaching University based conservation courses for maritime archaeologists and students of materials conservation.
Session 9: Maritime/Underwater Cultural Heritage in Southeast Asia

Southeast Asia (SEA) has been rich in maritime and underwater cultural heritage (UCH) over a long period, from ancient pre-history, through the age of commerce, into the World War II era. Recently, UCH research, survey, and mapping activities; preservation and management efforts; as well as human capacity building programs show the promising progress in SEA countries. However, various threats to UCH preservation and some shortcomings still can be found in many SEA countries, for instance, lack of funds, inadequate technology, limited human resources, and also lack of public and government attention to UCH legal protection and its long term preservation.

This session will highlight some topics, including current status of UCH preservation; current research or investigation on maritime heritage or UCH in SEA countries; maritime history in SEA; current legislations; recent human and natural threats to UCH in SEA countries; raising awareness and public education programs; in-situ preservation of UCH; sustainable shipwreck tourism development and balancing preservation efforts with economic benefit; community and general public engagement in UCH management plan; regional capacity building in Southeast Asia; as well as collaboration opportunities among stakeholders and SEA countries in researching, protecting, preserving, and managing UCH sites.

Session Chair: Mr. Stephen Davies
Maritime Activities in Ancient Bali

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Abstract

Archaeological discoveries at Sembiran and Pacung in Northeastern Bali indicate that contacts between Bali and India, China, as well as Mainland Southeast Asia have already occurred at the late second century BC. At the same time, maritime activities and exchanges of goods might have also existed between these areas.

Inscriptional data from the late 9th up to the 12th century describe the regulations concerning the stranded ship. The use of woods of the stranded ship, the treatment of foreign traders who died in the port sites in Bali, as well as the utilization of their inheritances are also mentioned in these inscriptions. In addition, the Balinese inscriptions dated from the 12th century also describe the types of watercraft such as ships (Chinese jong) and boats (bahitra) which encored at Manasa in the northern coast of Bali. The situation of port sites and social disturbances due to pirates are also described in the Balinese inscriptions. Bali seems to be located in the inter-regional trade routes connecting India, Mainland Southeast Asia, and China in ancient times, therefore maritime activities must be very busy in the northern coast of Bali.

Key words: Bali, ships, inscriptions

Introduction

Archaeological discoveries in northern coast of Bali indicate that the island has been involved in maritime activities for nearly 2150 years. The sites of Sembiran and Pacung which was part of ancient port of Julah produced archaeological artefacts mainly potteries of India, mainland of Southeast Asia, and China. In addition, glass, stone beads as well as Han’s bronze mirrors were also discovered at Pangkung Paruk in the northwestern coast of Bali. Two fragments of molds for casting bronze drum and
socketed bronze axe were discovered respectively at Sembiran (Ardika, 1991; Ardika and Bellwood, 1991; Calo et al., 2015). The discovery of fragments of molds indicate that Sembiran was also an important centre of local craftsmanship. The appearance of those artefacts suggests that long distance or international exchange or trade might have already occurred at the beginning of our century.

Inscriptional data from Julah and Sembiran suggest that maritime activities and trade might have continuously occurred in the northeastern coast of Bali at least from the late second century BC until the 12th century AD. The inscription of Sembiran Al dated AD 922 mentions a market (pasar) and a market officer (ser pasar) at Julah. A regulation concerning stranded ships and their cargos (taban karang) was also stated in the inscription (Goris, 1954; Ardika, 1991). It records that people who lived at a fortified settlement (kuta) at Julah were attacked by their enemies (tarahan) and some of them fled to other villages. On the basis of the inscriptional data, this paper will describe several pieces of information related to maritime activities in ancient Bali from the early 10th up to 12th century AD. Relevance data from later period are also utilised in this paper.

**Regulation Concerning Stranded ship (Taban/Tawan Karang)**

Balinese inscriptions from the early 10th century AD stated the regulations (taban karang) concerning stranded ships or watercrafts in northern Bali. The inscription of Sembiran Al states that if there were stranded ships, boats, or canoes within Julah territory, which are known to the villagers, the cargos had to be donated to the temple for welfare. The captives must be reported to Sang Ratu or King Ugrasena who reigned Bali at that time.
In order to maintain and enforce this regulation, worship was to be offered to Bhatara Punta Hyang (Agastya?) (Ardika, 1991: 227).

As far as Taban or Tawan Karang is concerned, this regulation was still utilised until the colonial period in the 19th and the 20th century. The Dutch government and the Balinese kings ratified the regulation, however, they did not implement it properly. The case of Tawan karang at Sangsit port in north Bali was the trigger of Buleleng and Jagaraga wars in the 1846 and 1849, between the Buleleng’s king and the Dutch government. The Jagaraga war can be said as the end of the Buleleng sovereignty, and the beginning of colonialization of the Dutch government in north Bali (Wirawan, 2017).

Similar phenomena also occurred at Karangasem and Klungkung kingdoms in east and south Bali. Conflict on Tawan karang regulation caused the Dutch government to send a military expedition to Karangasem and Kusamba, Klungkung. The Karangasem palace was occupied by the Dutch on 20 May 1849. Gusti Gede Ngurah Karangasem, the king, and his family members fought against it, causing them to be killed. Klungkung and Kusamba could be occupied by the Dutch troop at 3 pm on 24 May 1849 (Agung, 1989: 327). General Michiels and his troop rested at Kusamba Palace used as the headquarters of the General Commander Michels.

At midnight on 24 May or at dawn on 25 May 1849, Dewa Agung Istri Kanya, A.A. Ketut Agung and A.A. Made Sangging planned to attack the Dutch troop. At 3 am on 25 May 1849 the Klungkung soldiers reached the target. When the light bullet was fired, all the camps, which had been dark, became bright. General Michiels could be clearly seen standing in front of the palace.
A gun was fired by the Klungkung troops and the general’s right leg got shot, causing him to be upended. The bone of his right leg turned out to be completely wrecked (Agung, 1949: 328). The health officer suggested that it should be amputated; however, he disagreed. He demanded that he be carried to the command ship where he could be treated. His physical condition was getting worse and finally he died at 11 pm on 25 May 1849. On 26 May 1849 the corpse was carried by the warship “Etna” to Batavia (Agung, 1989, 328).

The conflict between the King of Badung and the Dutch East Indies government was triggered by the incident in which the Dutch-flagged ship “Sri Kumala” stranded at Sanur beach controlled by the Badung Kingdom on 27 May 1904. The Dutch East Indies government demanded that the compensation amounting to 7,500 guldens to be charged to the Badung King. The local people did not pay for the compensation as they swore that they had not robbed what the ship had carried including uang kepeng (coin with square hole in center). The Badung King’s refusal caused the Badung waters to be blockaded on 6 January 1905 (Agung, 1989: 5). On 20 September 1906 the final war or Puputan Badung occurred and the kingdom of Badung was conquered by the Dutch.

The practice of the tawan karang traditional law was getting weaker when the Bali and Lombok kings were getting familiar with the foreign governments especially the Dutch government (Wirawan, 2017: 2). Different perceptions of the tawan karang tradition led to the blood conflicts and wars involving the Dutch colonial government in Bali and Lombok from the middle of the 19th century to the beginning of the 20th century.
Since the 19th century, the *tawan karang* tradition has also been referred to as a legal institution of the traditional countries which could not only be found in Bali and Lombok. According to van Vollenhoven, the *tawan karang* institution could also be found in the Tanimbar archipelago and Central Kalimantan (Utrecht, 1962: 122). The practice of *tawan karang* showed the royal waters (*kliprecht*). *Tawan karang* was the right of a king and his people who controlled a coastal area. They had the right to detain and own any foreign ship. They also had the right to employ its passengers as the slaves that could be traded or killed. It used to be considered the law of god of the seas (Lord Baruna) who was believed to control the coastal area and sea (Utrecht, 1962: 122). However, it was then flexibly defined and applied.

**The Regulation for Foreign Trader**

The inscription of Bebetin dated 896 AD describes the regulations concerning the properties of *banyaga* (seafaring merchants who died at *Banwa Bharu* (Goris, 1954: 54). The properties had to be divided into two parts, although it is not mentioned what the two divisions were used for. It is also mentioned that timber from the wrecked ships of the *banyaga* were used for fences or palisades around the fortified settlement (*kuta*) at *Banwa Bharu*. It thus seems that the fortified settlements at Julah and *Banwa Bharu* were both surrounded by wood or bamboo fences (Ardika, 1991: 141). This was also the characteristic of city in Southeast Asia between the fifteenth and seventeenth centuries AD (Reid 1980: 242).

It should be noted that the terms *kuta* and *ser pasar* (market officer) are also mentioned in the inscription of Bebetin AI dated AD 896 (Goris, 1954: 54). *Banwa Bharu* could have been another port site in north Bali, possibly
located near the modern village of Sangsit, about 15 km west of Julah, where the small port still exists.

Based on the inscriptions of Bebetin AI dated AD 896 and Sembiran AI dated AD 922, it is impossible to find wrecked ship in the northern coast of Bali. It is due to the regulation that the timbers of the wrecked ship was used for fences or palisade of fortified settlement at Julah and Banwa Bharu.

**The Type of Watercrafts**

The Balinese inscriptions mentioned several types of watercrafts including *perahu*, *bahirita*, *jong*, *lancang*, etc. For instance, the inscription of Sembiran AI dated AD 922 mentions: IIIb.3 *yanada taban karang ditu, parahu, lancang jukung, talaka* ... (Ardika, 1991: 227; Goris, 1954). It means if there were ship, boat, canoe and canoe (?) captured based on *taban karang* regulation at Julah. Based on Sembiran AI inscription at least there were four types of watercrafts at that time. The inscription also indicates the Balinese can make canoe or ship. There are several terms of watercrafts mentioned in Old Balinese inscriptions. These terms are in Table 1 below.

*Table 1. Several terms of watercrafts mentioned in Old Balinese inscriptions*

<table>
<thead>
<tr>
<th>No</th>
<th>Balinese inscriptions</th>
<th>Terms of watercrafts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bebetin AI dated AD 896</td>
<td><em>Lancang, parahu</em></td>
</tr>
<tr>
<td>2</td>
<td>Sembiran AI dated AD 922</td>
<td><em>Parahu, lancang, jukung, talaka</em></td>
</tr>
<tr>
<td>3</td>
<td>Sembiran AIV dated AD 1065</td>
<td><em>Jong, bahitira, parahu</em></td>
</tr>
<tr>
<td>4</td>
<td>Sembiran C dated AD 1181</td>
<td><em>Parawu, jong, banawa</em></td>
</tr>
</tbody>
</table>
The term of *parahu* or *parawu* has been mentioned in the four inscriptions namely Bebetin AI (AD 896), Sembiran AI (AD 922), Sembiran AIV (AD 1065), and Sembiran C (AD 1181). The term *parahu* or *parawu* literary means boat (Zoetmulder, 1982: 1280). *Parahu* seems to be the oldest watercraft mentioned in Balinese inscriptions. *Lancang* was mentioned in the inscriptions of Bebetin AI (AD 896) and Sembiran AI (AD 922). *Lancang* literary means small boat (Zoetmulder, 1982).

The term of *Jukung* was mentioned in the inscription of Sembiran AI (AD 922). *Jukung* means small vessel or dug out canoe (Zoetmulder, 1982: 752). Even today, *jukung* is still made and used in modern Balinese. Similar to *Jukung*, the term *talaka* was only used mentioned in the inscription of Sembiran AI (AD 922). *Talaka* literary means canoe. The term *Jong* was mentioned in the inscriptions of Sembiran AIV (AD 1065) and Sembiran C (AD 1181). *Jong* is sea going ship (Zoetmulder, 1982: 748). It is also associated with the Chinese ship. The term *bahitra* was only mentioned in the inscription of Sembiran AIV (dated AD 1065). This term literary means boat or vessel (Zoetmulder, 1982:188). The term *banawa* was mentioned the inscription Sembiran C (AD 1181) which literary means boat or any kind of ship (Ardika, 1991: 262). On the basis of these inscriptions, Julah seems to be one of the most important ports or harbours in the northern coast of Bali. Chinese *jong* and big ship might have anchored at Julah in the 11th and 12th century AD. During the Song dynasty, China also took part in trade out of China.

**Piracy in Ancient Bali**

The *kuta* or fortified settlement and *pasar* or market at Julah were attacked by enemy or pirate many times. The attacks caused social disturbance in Julah and the adjacent area. This situation was first mentioned in the
inscription of Sembiran AI dated to AD 922. The inscription states: Ib. 3. ...*lagi tawan bunin*...they are continuously captured by enemies... (Ardika, 1991: 221). The villagers of fortified settlement at Julah were captured by enemies, and some of them might have fled to other villages. Therefore the king Ugrasena asked them who fled to other villages to return to Julah.

The inscription of Sembiran All dated to AD 975 mentions that king Sri Janasadhu Warmadewa gave a grant of copper plates inscription to the market officer at Julah namely Ida Kumpi Dyah Damai, who gathered together the villagers of Julah and those who lived around the fort, being many of those who returned during the reign of *Sang Ratu* (king) who was buried at Bwah Rangga (Ardika, 1991:228-233). The inscription mentions the regulation concerning the rights and responsibilities of the villagers of Julah, and those who lived around the fort.

It is worth to noticing that the inscription of Sembiran All dated to AD 1016 indicates that the village officers of Julah pay respect to *Sang Ratu* (Queen) Sri Sang Ājñadewi. The villagers told the Queen that the number of families who lived at Julah formerly was 300, but now only 50 remained. Therefore, the villagers asked taxes to be reduced (Ardika, 1991: 334). On the basis of those inscriptions it seems that the fortified settlement and a market at Julah was attacked and the villagers were killed or captured by enemies or pirates? This attack caused the villagers of Julah to flee to other villages. The Queen or central authorities called them to return to Julah. The Queen renewed the regulation and also reduced taxes for those who lived at Julah.

The inscription of Sembiran AIV dated to AD 1065 indicates that the village officers of Julah they consulted and paid respects to *Paduka haji*
or King Anak Wungsu. The village officers of Julah asked for a grant in order to write down their inscription on copper plates, which was a grant of the previous king. Because they did not think that what was described in the palm leaves would be preserved for the future. It should be noticed that the villagers were allowed to destroy coconut trees which blocked and caused it to be seen by a plundering ship which came to Julah at night (Ardika, 1991: 247). This statement suggests that central authority or King Anak Wungsu protected the villagers of Julah from the attack of plunderers or pirates.

As far as plunderers or piracy is concerned, it is clear that their activities caused social disturbances as well as economic instabilities. The inscriptions of Sembiran AI, Sembiran All, Sembiran Alll, and Sembiran AllV suggest that the villagers of Julah were killed and captured by plunderers, and some of them also fled to other villages. This social disturbance at Julah was handled by Queen or King of Bali, Regulations concerning those people who lived at Julah were described at royal edits. From an economic point of view, plunderers or pirates at Julah might search for goods and valuable things. As already noted, there was a market place at the fortified settlement at Julah. The plunderers or pirates at Julah not only killed and captured people, but also robbed goods and materials at the market. Similar stories were mentioned in the inscription of Sawan AI or Bila I dated to AD 1023. The villagers of Bila were reduced from 50 to 10 families who could not pay the full tribute, so they had to ask the king (raja) for a reduction (Goris, 1954: 101-103). Why the villagers of Bila decreased in number was not mentioned in the inscription.

Piracy might have already existed in ancient Bali around the 9th up to 11th century AD. The pirate might attack the anchored ships and market at of
Julah. They killed and captured the villagers and possibly robbed the cargos as well as the goods at the ports site of Julah. The coastal villages in the northeastern coast of Bali might have been plundered by pirates. This attack caused the villagers to flee to other villages, and this automatically brought about the decreasing number of the people in the village.

**Conclusion**

Bali has been involved in maritime activities since prehistoric times. The Balinese inscriptions from the late Ninth and early Tenth century indicate the regulations concerning stranded ship (*taban/tawan karang*) and an inheritance of foreign traders (*banyaga*) who died at *kuta* or fortified settlement in the northern coast of Bali. These regulations suggest that the central authority or king/queen has managed to control the coastal areas of Bali at least in the late Ninth and early Tenth century AD. The regulation of *taban/tawan karang* was still utilized until the 20th century and throughout the colonial period. In other words, the regulation of *taban/tawan karang* has been used for more than 1000 years. The *taban/tawan karang* regulation also triggered conflict and war between the Balinese kings and the Dutch Government in the 19th and 20th century.

Several types of watercraft were mentioned in the Balinese inscriptions such as: *parahu, lancang, jukung, talaka, jong, bahitra*, and *banawa*. These terms might have been related to the sizes and measurements of watercrafts.

Piracy might have already existed in Bali or in Indonesia in general in the early 10th century AD. The fortified settlement or *kuta* and *pasar* or market at Julah were attacked by plunderers or pirates. The villagers were killed.
and captured by plunderers, and some of them fled to other villages. The villagers who lived at Julah could not to pay the full taxes and they asked for reductions to the king/queen. Therefore, the king/queen asked them to return to Julah.

References


China’s First Purpose Designed and Built Lighthouse: Findings from the Analysis of a Long Lost but Recently Rediscovered Photograph of the Xiyu Pagoda Light (李西山塔晚燈, Lixishanta Wangdeng)

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Abstract

Although it has long been known that a purpose designed and built ‘pagoda’ lighthouse existed on the Penghu Islands’ Xiyu (Fisher’s) Island as of 1778, exactly what it looked like, how large it was and where it was placed vis-à-vis the 1875 Chinese Imperial Maritime Customs light that still exists has never been known. Existing Chinese data, from a contemporary stele the text of which was written by or for the then Taiwan Prefect, Jiang Yunshu, uses self-consistent traditional units of measure suggesting the seven level pagoda was of the order of 18m or more high. Other contemporary Chinese data speak of a powerful light that, rhetorically at least, could be seen from Taiwan in one direction and Xiamen in the other! Western reports, which we have from 1797 and more systematically as of Captain Richard Collinson’s survey of 1844, propose a tower only some 10m high and a very occasional light visible at best only one mile distant. There has been no way of reconciling these very different reports until the recent discovery in a major British archive of a photograph of the 1778 pagoda - as rebuilt after typhoon damage in 1823 - that can be dated to c.1875. In this paper this photograph will be presented and discussed and an attempt made, thanks to modern three dimensional modelling, to give accurate dimensions. Additional discussion will focus on features of the pagoda lighthouse revealed in the photograph that connect with hitherto ill-understood remains both in the present day lighthouse compound and in the Buddhist temple in the nearby village of Wai’an.

Keywords: Fisher Island, Collinson, Revit, zhang, chi, Jiang Yuanshu, temple, Heavenly General
Introduction

The author is part of a City University of Hong Kong lighthouse heritage project sponsored by the Office of the Provost and led by Prof. Steve Ching. The project aims to make Hong Kong, Taiwan and China’s lighthouse heritage more widely known and appreciated through well-made videos focussed on specific heritage lighthouses.

In support of the film-making the lighthouses are extensively researched, which is the author’s main role in the team. Other than the obvious aim to ensure that the videos are factually correct, the project aim is to highlight the international, cross-cultural character of heritage lighthouses and the strong historical links between China’s coast and the wider world, as well as to provide or supplement data for use by historians and archaeologists working on regional lighthouse heritage. One of the team’s recent foci has been the heritage lighthouses of Taiwan’s Penghu Islands (澎湖群島), in particular what is today called Yuwengdao Lighthouse on Yuweng Dao (漁翁島 (Fisher Island)) in Xiyu County (西嶼鄉)).

The Puzzle

The location of the old Pagoda Lighthouse\(^1\) is now occupied by Penghu and Taiwan’s oldest modern lighthouse, the Yuwengdao Lighthouse. The latter was built in 1875, following a site survey in 1874, as part of the second lighthouse programme of the CIMCS Marine Department.\(^2\) However, it had been preceded by an earlier, entirely Chinese designed, funded, and built structure dating from a century earlier.

Data recounting the erection of the 1778 lighthouse and an affiliated Mazu Temple can be found on two granite stelae, now so weathered as to be all but illegible, in the forecourt of the Wenchang Wang Temple (西嶼鄉外
垵村溫王宮) in the village of Wai’an (外垵), 1.4 kilometres west-north-west of the old lighthouse site, and two copies in the present lighthouse compound. The structures were built with money raised by the Taiwan Prefect, Jiang Yuanshu (蔣元樞), and the local Penghu magistrate, Xie Weiqi (謝維祺), largely from Taiwan and Xiamen based shipping interests. Styled the Xiyu Pagoda Courtyard, the construction began in 1777 and completed in 1778 on the site of a collapsed 17th century pagoda or, possibly, fort. In 1823, a typhoon severely damaged the structure. It was rebuilt and renamed the Xiyu Pagoda Temple and was back in commission in 1828.

The pagoda was of seven storeys and five zhang (丈) high, built of granite and was in some sense Buddhist. The stele text also gives the measurement of the sides of the base of the tower as five zhang. Although the translation is uncertain, it further states that each storey was served by a staircase that rose seven chi (尺), which may be another way of saying each floor was 7 chi high. That would be consistent with the height of five zhang allowing for a roof finial.

Five zhang is not a determinate measurement. The zhang was divided into 10 chi but the relevant modern value of the chi in SI units is uncertain. The original value is thought to have been 9.5" (0.24m) to 9.8" (0.25m). As Louise Levathes notes however, by the Ming dynasty and probably for centuries before as in contemporary Europe, values for the chi varied between regions and between trades. Within shipbuilding alone one provincial range was from 10.53" (0.27m) to 13.338" (0.34m), and across China could be as small as 9.5" (0.24m). G.R.G. Worcester noted that in his days (1930s-40s) the value of the chi varied from 8.6" (0.22m) to 27.8" (0.71m) and that the China Commercial Guide of the day gave over 100
different values for the unit. The bounds of those values place the height of the Xiyu Pagoda Light as lying between 11m and 35.5m.

There are also descriptions in western sources. The earliest was on 1st July, 1797 by the Briton, William Broughton, passing two or three miles to westward, who noted, "an Obelisk of Stones rais’d I shou’d imagine for the advantage of the Junks who trade to these Islands." The next came from Captain Richard Collinson’s surveying exercise along the coasts of China in HMS Plover from 1843 until 1846. The resulting sailing directions (a sort of sailor’s guidebook), the “Sailing Directions for the Panghu or Pescadore Archipelago, with notices of the islands”, recorded, “On (Fisher’s Island) SW. extreme is a Light-house 225 feet above the sea.”

A little over a decade later, a further British survey in 1858 by Captain GAC Brooker in the steam paddle sloop HMS Inflexible supplemented the earlier description. The third edition of The China Pilot in 1861, collated by John W. King, gave Captain Brooker’s update, which agreed with Collinson’s height above the sea, identified the date of construction, but declared the pagoda to be only 30’ (9.14m) high. It is evident that the differences between the given western height and the estimate from Chinese values (11m-35m) are hard to reconcile.

In addition to the uncertain measurements and verbal descriptions, two images of the old pagoda lighthouse survived. Jiang Yuanshu commissioned some paintings of his time in Taiwan that are now in the National Palace Museum, Taipei. One of them is of the Penghu Islands and shows a distinctly geographically separated pagoda and temple. The temple, shown in some respects where today Wai’an lies, is labelled Tiān Hòu gōng (天后宮, Tian Hou temple). The pagoda, shown quite conventionally as of a traditional form with seven storeys including the
base, is labelled *Juān jiàn xī yǔ fútú* (捐建西嶼浮屠, roughly “Buddhist pagoda/stupa established on Xiyu (Island) by donation”).

The second small and schematic image is on Captain Collinson’s manuscript chart. The structure shown had a wide base and a low building with a short tower on its seaward side. A doorway faced the viewer and a lantern chamber with a traditional curved-eaves roof topped the whole. Neither image is helpful in resolving either measurement issues or the actual appearance of the pagoda light.

**Physical Remains**

At the lighthouse site there is thought to be the following possible remains. To the north of the present lighthouse compound there is a debris field of bricks and brick fragments that may be associated with the earlier structure. No archaeological work seems to have been done on this, so the exact status of the remains is uncertain. Within the lighthouse compound there are two walls, of unknown age, not aligned with the present structure that folk memory associates with the earlier structure. There is also a raised, almost square c.15m x c.15m area similarly associated in folk memory with the earlier structure but aligned with the present compound on approximately 018°T south to north and 290°T east to west axes, not the 000°/180° and 090°/270° of the old walls. In neither of these cases has systematic research been done. Folk memory also associates some of the cut granite stones used in the present compound with relics from the older structure.

In addition, local Wai’an folk memory believes the smaller of two images of Mazu in a side altar in the Wenchang Wang Temple may have come from the temple built near the Pagoda Lighthouse. In a side recess in the
Wenchang Wang Temple there is also a board with large, carved characters, believed to be from above the altar in the small Mazu temple.

Separately, in the Wai’an, Buddhist, Cí Hángsì (慈航寺) Temple there are twelve, carved, bas-relief stone tablets around the main altar that are also associated with the old lighthouse buildings.\(^{11}\)

Finally, in the modern lighthouse enclosure is a solid, granite, jar-shaped object, around 0.80m tall and 0.4m in maximum diameter with three holes drilled into its top surface. Local folk memory describes this somewhat loosely as ‘the old light’, though exactly what is intended by the description is not certain. The three holes in the top may have been locators to hold something in position on the top surface of the stone.

It follows that no data, or no fully reliable data existed as to what the old pagoda lighthouse looked like, what its dimensions were, where exactly it stood, and how it related to the affiliated Mazu Temple. My main research thrust was to find a reliable image, if one existed, so that we could use it to resolve some of these puzzles and in the video.

**Discovery**

After a frustrating initial period that looked like the search could take years and may have gone nowhere, blind good luck during an Internet search found a photograph titled “Lighthouse on Fisher Island (Pescadores)”, dated to c.1900, in the collection of London’s Royal Geographical Society. The luckily spotted screen grab image was good enough to identify a catalogue number that, on enquiry, Ms Joy Wheeler of the RGS confirmed to be what I sought.

An inspection of a high-resolution, digital copy provided by the RGS allowed a ballpark date of 1874/75. We know that a Chinese Maritime Customs survey of the site took place in 1874, that the first notice of an
intended new light was published shortly after construction began on 11 July,\textsuperscript{12} and that it was first lit on 20\textsuperscript{th} December 1875.\textsuperscript{13} The light tower itself has a label above the entry reading “David Marr Henderson 1874.” Indicative of the advent of the new authority and its assumption of control over the old lighthouse, in the left middle ground of the picture there is a small, upright stone block reading 閩海關 (Mǐn hǎiguān – Fujian Maritime Customs (authority)).

Fieldwork done in Penghu in October 2016 meant immediate identification of one significant element in the photograph. In the left background of the image, just below the horizon line, there is a conspicuous row of pale objects. When shown in detail, it shows sixteen wedge-shaped blocks of grey stone. These are identical in conformity and number to the stones comprising the foundation of today’s lighthouse tower. Close to the blocks are at least six long wooden poles of the sort that are typically used as the main uprights in Chinese bamboo construction scaffolding. In addition, on the top of the plinth there appears to be some heavy cable and possibly chain flaked down, along with what may be a heavy sheave. There is also a tall bin in the shape of a truncated cone close to the entrance door from the plinth into the pagoda. It is possible to read these as preparations for the demolition of the older structure.

In short, the first elements necessary for the construction of the new lighthouse and demolition of the old are in place in the photograph. That would be consistent with a generous date bracket between at the earliest the very end of 1874 and the latest late spring/early summer 1875. The image shows an uncharacteristically stepped, octagonal pagoda fronted by a low, three component building. The latter consists of two projecting, single storey wings joined by a gateway topped by an illegible signboard at the right hand end and by a slightly taller, single-storey building across
their ends nearest the pagoda. A small courtyard lies between the gateway and the transverse building. Between the transverse building and the pagoda would appear to have been a second courtyard formed by the back of the transverse building and two enclosing walls joining the ends of the transverse building to the corners of the pagoda base.

The pagoda was built of ashlar blocks described in the stele as granite. The laying pattern cannot be distinguished, save that it is in parallel courses of long blocks irregularly interspersed with shorter stones that may be bond- or through stones. The small temple would appear by contrast to have been built using a random rubble construction technique with ashlar quoins.

The pagoda is a low, stepped structure consisting of six octagonal storeys stood on a massive square plinth and topped by a classic, curved eave Chinese roof, itself topped by a Buddhist, ‘precious water jar’ shaped finial. This is identical in shape to ‘the old light’ that now stands in the present lighthouse compound. The seven levels are not equal, the values being broadly what we treat as a ‘whole height’ base or 1st and 4th, 5th, 6th and 7th levels, with the 2nd and 3rd levels each of half height. However, as with all vernacular, artisanal architecture, the ‘whole height’ measure, taking this to be the height of the plinth (=1), varies irregularly between 0.66 and 1.03.14

Much the most important element in the photograph is the six visible inset tablets with bas-relief images carved on them. These are on storeys four, five and six. The images on each level are on alternate faces. However the images on storey five are on the four faces left blank on storeys four and six. The visible images imply a further six on the faces of the pagoda out of shot for a total of twelve. Insofar as the resolution allows us to decide the matter, the visible images tally with some of the twelve images
in the Cí Hángsì temple in Wai’an, believed to have come from the old pagoda. The images would appear to be variants on what Chinese (and Japanese) Buddhism call the Twelve Heavenly Generals (十二神將, Shi’èr Shén Jiāng). In our estimation, the two sets of twelve are the same and more research is at present concerned with these images.

There is no certainty about the orientation of the pagoda and temple. However, the shadows beneath the shutters projecting from the two wings of the small temple suggest a sun high in the sky within an hour or so of local midday. The initial hypothesis was that the pagoda and temple complex were orientated North/South, with the pagoda to the north. This idea is supported by the entrance to the tower being on the south, and the two evident doors from the lantern chamber to the upper parapet walkway (which can be identified because some of its stonework has visibly collapsed), opening east and west. All the access points make sense because in Penghu the prevailing, very strong winds of winter are NE to N and in the summer, though far less strong, from S to SSE. The entrances thus offer sheltered access from the prevailing winds.

**Evaluation**

**Dimensions**

The main puzzle was the uncertain dimensions of the pagoda and temple, much confused by the very different values given by the traditional Chinese units of measure and the height of the pagoda from British sources.

To help decide this and more closely date the photograph, Steve Ching organized the help of Anthony Leung Ka Ho, an architecture student at the City University of Hong Kong, who is an adept with Autodesk Revit Architecture software. With the photograph as a backdrop template,
Leung drew a 3D CAD drawing, which he artistically rendered to replicate tones and textures of the original albumen image. This was then a fully manipulating computerized 3D model, the only missing aspects of which were the interior of the buildings, on which we remain entirely ignorant. All we can conjecture at present is that a closer investigation of the brick debris area just north of the present compound may give evidence of the tower interior to have been of brick.

The software also allowed analysis of the model to establish probable parameters for dimensions. This was done by scaling off such things as the height of any people and any known dimensions of objects in the original photograph. To this end the most important features of the photograph were two.

The first was the two human figures. One stands on the plinth leaning against the wall of the pagoda’s second level with his elbow resting on its top. The second is standing in a doorway leading out from the small courtyard between the Mazu temple and the pagoda. Both figures are dressed in western clothing, though it is not possible to be sure if both are in fact westerners. In the present context, their importance lies in helping to narrow down feasible answers to the issue of the height of the pagoda. The broad height bracket that covers averages of the era is for Chinese people around 1.63m, Europeans around 1.67m and North Americans around 1.73cm.\textsuperscript{17} The normal variance in the mid-1870s for the average heights in question is ±7cm, so with one Chinese and one Western person, working numbers were taken to be 1.55-1.65m and 1.75-1.85m. Similarly, it was supposed that doorway heights in the visible doors were c.2m. Scaling the drawing using these values led Mr Leung to use a plinth height of 3.1m, which gave a pagoda height of 16m.
This estimated value vindicated and gave a more precise value to the traditional Chinese measure and led us to discard the Captain Brooker’s claimed 30’ (9.14m), but left us uncertain how to evaluate the given height of the lantern of 225’ (68.6m) agreed by both Collinson and Brooker, which will have been measured by vertical sextant angle and will have been accurate to within quite close tolerances.

Today’s height above sea level to the focal plane of the light is given as 199’ (61m); the height above ground of the focal plane is listed as 36’ (11m).

It follows that ground level is 163’ (50m) and within reasonable error margins this is confirmed by Google Earth, with its terrain layer set ‘on’, on which the average of eleven readings inside the lighthouse compound around the light itself is 48.4m. On that measurement the pagoda would have been between (68.6m – 48.4m) = 20.2m and (68.6m – 50m) = 18.6m. The estimated spread for the pagoda’s height is therefore 16m to 20.2m giving a chi of 0.32m to 0.404m.

One route to tighter measurement is via the bas-relief carvings on the pagoda’s faces and now in the Cí Hángsì temple in Wai’an. Whilst we cannot be certain that the tablets are exactly as they were when in situ, given that they are granite it seems unlikely they will have emerged significantly reduced in size. Although the twelve tablets are not all of the same dimensions, they are all the same height to within c.10mm, which is c.500mm. Using these as a gauge suggests a pagoda height of c.15.5m.

The final benefit of the software was that, once we were sufficiently satisfied that the CAD model we had derived was close enough to what we thought the photograph showed, it enabled us to 3D print a plastic scale model, the evaluation of which has allowed us further to refine the 3D CAD drawing.
Orientation

An additional bonus was that with the use of the software’s built in sun and shadow creation tools and some initial ideas, based on crude on-screen analysis of the photograph and data on annual and diurnal solar movements (altitude/elevation, azimuth and declination) derived from a nautical almanac, the shadow patterns observed in the original photograph could be replicated on the CAD model. The key shadows were those cast by the shutters on the temple annexes’ windows, by the overhang of the eaves above the windows, and by the intensity of the shade on the left side of the ensemble of structures.

Once the shadows were matched, the software settings gave the time of year in which the photograph was taken to within extremely tight parameters. The precision of the result is probably illusory but the software suggests the photograph was taken at c.1105 a.m. on 17th May, 1875. A safe conclusion would be that the image was taken in mid-May 1875.

The software also supported the hypothesis that the pagoda and temple complex was orientated facing south. This was derived from the azimuth (compass bearing) of the sun when the shadows on 3D rendering and photograph matched. For the sun’s path from sunrise to sunset was shown on the CAD drawing as a celestial arc orientated in relation to a compass rose on the ‘ground’ around the model. This showed that to within a few degrees the orientation of the structures was as surmised.

Location

The final element of the puzzle, which could then guide further, on site investigation, was the location of the pagoda and temple complex in
relation to the present Yuwengdao Lighthouse compound. The photograph offers only three indirect hints.

The first and least reliable is the stockpile of cut stones for the platform on which the new light would be erected. Given that each would have weighed perhaps two tonnes, it is unlikely they would have been stockpiled very far from where they were expected to be needed, though manifestly well out of the way of the intended demolition work on the old pagoda and temple and subsequent marking out of the site and site formation.

A second, possibly more reliable hint is what appears to be the line of a footpath or track coming in from the right, about one third of the way up the photograph’s edge, running across in front of the temple and petering about in the area of what we surmise to be scaffolding poles. There is a fork in the path just to the left of the temple, leading around in the general direction of the doorway into the back courtyard between temple and pagoda, suggesting that there may have been no direct access from the temple into the courtyard and to the pagoda. Supposing the old structures to be facing south, the track has roughly the alignment of today’s motor road from Wai’an as it reaches the lighthouse compound, which is what one would expect.

The present location of the lighthouse is surrounded on the southwest, west and northwest by a roughly ten metre high, vertical cliff varying from twenty to forty metres from the compound wall. Because of this, and as we know from how new lighthouse machinery was delivered by the Japanese authorities in 1937 or 1938, the materials for building the new lighthouse will have been landed at Wai’an and then probably carried or dragged overland to the intended lighthouse site along the track we can see.
This thought leads to the final, more indicative, but extremely hard to interpret hint. This comes from the horizon beyond the pagoda and temple. The indicator is the visibly different ‘firmness’ to the horizon line on the two sides of the building complex. On the left it is sharp and closer to the camera. On the right it is further away, less well defined and suggestive of ground rising very gradually up the right of the picture. When related to a contour map of the south western end of Xiyu Island, the presumed location of the old structures can be inferred from these observations and the location of the materials stockpile shown.

Put briefly, the left horizon is the nearby cliff edge. The right horizon, which reappears from noticeably further ‘behind’ the old structures, suggests that, in the region we cannot see behind structures, the horizon has trended more north-easterly. This is what it does on the ground today. From the contour map, we can also see that northeastward through east from the presumed location the ground rises very slowly and unevenly to around 60m as part of the plateau on the western extreme of which today’s lighthouse compound stands. This fits the image and helps explain the less sharply defined horizon line to the right of the buildings.

A further bonus of the 3D modelling software is that it allowed us to work out the placement of the camera in relation to the building depending on some tentative conclusions as to the lens used. This in turn allowed us to assess the suggestion that the raised area by the present generator house and the old wall on the north side of the animal pen are relics of the old structures.

From a contour map with today’s compound, it is clear the camera and photographer had to have been almost on the edge of the low, 10m cliff that surrounds today’s compound from south round to north, at most around 40m distant but as little as 20-25m. The computer modelling
showed that this was indeed the case. Taking the centre of the west wall of the temple and pagoda complex as the reference point, the analysis placed the camera 28.94m away in a direction of $210^0$T so that it stood just short of the cliff edge. The angle of around $20^0$ between the camera and the top of the pagoda accounts for the foreshortening evident in the photograph.

That this was the broad set of relationships was partially supported by a review of the range of what were called view or landscape lenses in use in the 1870s. Crucially, these had angular fields of view of $60^0$ to $100^0$, with the most common types having a field of view of $60^0$ – $80^0$. Analysis suggested that the lens used to take the image covered an angular field of view of $63^0$. This incidentally also helped support our conclusions derived from other sources as to the height of the pagoda.

This photographic and desktop analysis is intended as a preliminary guide to guide on site investigation that will serve to assess the analysis with archaeological work on the area of raised ground in the pagoda and the area with brick remains to the north of the present compound.

**Conclusion**

In default of precise data, our research has shown how, with modern computerised tools and a photograph, uncertain verbal and visual data from historical sources about vanished coastal buildings like lighthouses can be used to derive quite tightly defined measurements and locations that, in turn, can help guide subsequent archaeological fieldwork.

**Endnotes**

1 The first western chart named it Lixishanta Wangdeng (李西山塔晚燈) for reasons utterly obscure. Although western Light Lists referred to the light as Litsitah Light until well into the 20th century, in Penghu the name is unknown and the characters bear no relation to any current or
historical Chinese name. In early days the Chinese for lighthouse was 晚燈 (wǎndēng, night light), not today’s 燈塔 (dēngtǎ, light tower).


3 大清乾隆44年 (1779) 澎湖廳通刊謝維祺撰的「澎湖西嶼浮圖記」(建修西嶼塔院落成碑記). The local rock is basalt, so if the structure was of granite, it will have been imported, probably from Fujian.

4 see 清乾隆43年 (1778) 台灣府知府蔣元樞所撰的「刀建西嶼浮圖記」(建修西嶼塔院落成碑記 / 創建西嶼塔燈碑記)


6 Worcester, G.R.G., 1947-48. The junks and sampans of the Yangtze; a study in Chinese nautical research, 2 vols., Inspectorate-General of Customs, Shanghai: vol.1, xiv. Morrison, John Robert, 1834. A Chinese commercial guide, consisting of a collection of details respecting foreign trade in China, The Albion Press, Canton: 70 gives a range of 12.65” (0.32m) to 14.58” (0.37m). A later edition has values 12.1” (0.31m) to 14.81” (0.38m), see Williams, Samuel Wells, 1856. A Chinese Commercial Guide, 4th ed., The Chinese Repository, Canton.


10 Collinson, Richard, 1844, Draft survey, H.M.S. Plover and Young Hebe. Hydrographic Office archives, L4368 Shelf 13G.
The project team is indebted to Mr Xu Youzhi, president of the Da Chi elementary school and keen local historian for showing us these relics.


March 3, 1876, Notice to Mariners No.25 —CHINA—PESCADORES ISLANDS—FISHER ISLAND. (1.) Fixed Light in Litsitah Point, The London Gazette, No.24302: 1734 The version of the Taiwan National Heritage Database in Chinese contends that the light was first lit on 18 November, shortly after completion.

The actual values, using the plinth as unity, are approximately: Plinth = 1, 2nd level = 0.41, 3rd level = 0.34, 4th level = 0.81, 5th level = 0.75, 6th level = 0.66, 7th level (to top of finial) =1.03. The total value is exactly 5 ‘plinth units’

In general temples – like many important Chinese buildings – were orientated (i.e. had the principal entrance) facing south – see Mak, Michael Y. and So, Albert T., 2015. Scientific Feng Shui for the Built Environment: Theories and Applications, New Ed., City University of HK Press, Hong Kong: 83-85. Tian Hou /Mazu temples were often exceptions since there was an overriding requirement that the temple faced the sea, see Wang, Chen-shan Ellen, 2003. Historic Preservation in Taiwan: The Restoration of Tainan Da Tianhou Gong, unpublished Master of Science thesis, University of Pennsylvania: 50. The Xiyu Pagoda temple could achieve both.

See https://www.autodesk.com.hk/products/revit-family/architecture

see https://ourworldindata.org/human-height/ accessed on 15.5.2017


the values were 45m, 44m, 47m, 49m, 50m, 49m, 50m, 49m, 49m, 50m and 50m – Google Earth sampled 11.5.2017. Errors are known to be <±30m – see discussion at https://productforums.google.com/forum/#!topic/earth/3Th8MuHzKtE accessed on 15.5.2017

Online tables and calculators give one cubic metre of granite as weighing c.2,75 tonnes. Each of the granite stones will have been c.0.7-0.8 cu. m.

Oral testimony gathered in Wai’an Village, October 2016


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Living and Trading: A Dual Approach to Studying Southeast Asian Port Cities

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Abstract

The historical ports of Southeast Asia were highly active regional mercantile hubs located at the crossroads between the East Asian and Indian Ocean trading networks. These strategically places ports attracted merchants and sailors from the world over, some of whom stayed on a permanent or semi-permanent basis to carry out their business. By their very nature, Southeast Asian ports are thus both economic spaces dedicated to maritime activities, and cosmopolitan spaces where people from different social and cultural backgrounds came together. This duality is expressed in the built environment, which contains specialised structures to facilitate trade (such as wharves, warehouses, and boatyards) but also communicates people’s identity. This paper proposes studying historical port cities by combining a maritime cultural landscape approach and urban social theory to understand the economic as well as the socio-cultural fabric of Southeast Asian ports.

This approach will be applied to two very different port cities: Hội An in Central Vietnam, and George Town in Malaysia. Whereas Hội An was an informal temporary market place that grew to be one of the region’s biggest entrepôt ports in the 18th century, George Town was founded as a trading outpost for the British East India Company in 1786, before becoming the seat of many mercantile firms and banks in the 19th century.

Key words: ports, economies, structures, socio-cultural

Introduction

Ports, by their nature, are highly economic spaces dedicated to maritime activities. The ports of Southeast Asia, strategically located at the crossroads between the East Asian and Indian Ocean trading networks
(and by extension the East-West trading network), were chiefly stopovers and entrepôts through which moved traders from all corners of the world. Due to the monsoon trade, merchants would often stay in these ports for months at a time waiting for the winds change, and created settlements where the various traditions would intermingle, yet remained distinct (Li, 1998; Lockard, 2010; Reid, 1993). Southeast Asian port cities were thus — in addition to being highly economic — also highly culturally and socially diverse; in other words they were cosmopolitan. Craig Lockard (2010) described them as “places of economic exchanges as well as cosmopolitan gateways for the import and export of people, goods, and ideas.” This paper proposes to apply a maritime cultural landscape approach in conjunction with the environment-behaviour theory in order to highlight this duality and understand the fabric of historic Southeast Asian ports.

This paper will address two case studies to illustrate this dual approach: Hội An in Vietnam, and George Town in Malaysia. Both are inscribed on the UNESCO World Heritage List, Hội An in 1999 and George Town in 2008, under criterion (ii): “to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design” (UNESCO, 2016). Hội An is located on the Thu Bon river in Quảng Nam province in central Vietnam. It was established as a foreign port for the Nguyen Lords some time in the mid to late sixteenth century, though the exact date and circumstances are unknown (Dror and Taylor, 2006; Wheeler, 2006). Hội An was a successful entrepôt until the eighteenth century when was eclipsed by Đà Nẵng, a few kilometres north. During this time, the Japanese and the Chinese were the two largest foreign trading groups in Hội An. George
Town, Penang was established in 1786 by Sir Francis Light as an East India Company free port and naval base (though the naval base did not actually succeed) (Hussin, 2009). It was the first British port city in Southeast Asia, and had attracted over ten thousand Malay, Chinese, and Indian merchants within a decade (Hussin, 200; Lewis, 2016).

**Theoretical Background**

Both the maritime cultural landscape and environment-behaviour concepts ultimately aim to understand tangible manifestations of culture, the former from an archaeological perspective and the latter from an urban studies perspective. Underlying these concepts are discussions regarding the nature of culture. The urban theorist Amos Rapoport (1998) summarizes the scholarship on culture by presenting three complementary views of culture: “one view defines it as a way of life typical of a group; the second, as a system of meanings and schemata transmitted through symbolic codes; the third, as a set of adaptive strategies for survival related to ecology and resources.” He views culture as too abstract for his purposes (understanding culture in the built environment); it is unobservable and thus “essentially useless” in environment-behaviour studies (Rapoport, 1998). It is instead the “effects, expressions, or products” of culture, such as social variables, that are visible and useful (Rapoport, 1998). He describes increasingly specific expressions of culture in order to arrive at something actionable: lifestyles and activity systems. A lifestyle is “the outcome of choices about how to allocate resources,” in other words; it is composed of a series of activities, and is influenced by norms, standards and expectations (Rapoport, 1998). Christer Westerdahl arrived at a similar conclusion regarding maritime culture specifically, as will be described below.
Maritime archaeologists have long debated whether there is such a thing as a distinct maritime culture — that is a culture specific to communities living on or near the sea that is inherently and completely different to inland culture. Many have concluded that the separation between land and sea is not in fact absolute (Tuddenham, 2010; Westerdahl, 2007, 2011). Indeed, humans do not ever exclusively experience the sea unconnected to land (Mushynsky, 2011; Tuddenham, 2010; Westerdahl, 2007, 2011). Christer Westerdahl (2007) explains that maritime culture is “eminently a mixture, a creolization, of others. It is based on the subsistence gained from the seas and the water, and consists of all the thought patterns, cosmologies, customs, objects, phenomena and patterns of action connected with a life by the sea.” Like Rapoport, his view of culture is ultimately related to subsistence strategies, even referring to the “life mode” concept, and conceptualizing the maritime life mode as a series of subsidiary trades dictated in this case by living on the coast or related to a primary maritime trade, not unlike Rapoport’s lifestyle concept (Westerdahl, 1992, 2007). Some examples he presents are fishing, hunting, and gathering (at sea or on land), as well as boat building, shipping, ferrying, pilotage, and lighthouse attendance (Westerdahl, 2007). It is this recurring idea of culture as a “mixture” of activities that guides this paper. In order to understand the cultural fabric of Southeast Asian ports, a port should be seen as a sum of parts: a trading community, a crossroad of sea routes, and a concentration of different traditions.

Ports are often described in the literature as transit points: the point of change between land and sea, of changing modes of transportation, and of exchanging goods and ideas (Lockard, 2010; Reid, 1993; Parker, 2001; Westerdahl, 1992, 1999, 2006, 2011). They are also, in Westerdahl’s (2006, 2011) words, “maritime enclaves:” semi-permanent or permanent
settlements engaged in maritime activities. As he conceptualises maritime culture as a concentration of maritime activities, these enclaves can be considered the origin of maritime culture, as well as its centre (Westerdahl, 2006, 2007). In them are thus found the “remains,” or expressions, of maritime culture such as sailing marks, beacons, loading places, anchorages, inns, and other cultural deposits (Westerdahl, 2006). Likewise, Jan Bill and Birthe Clausen (1999) argue that maritime trade directly impacts the physical development and appearance of towns, giving them a distinct “maritime town topography.” These are towns that developed around a port or harbour, and thus had to build specialised structures such as wharves, jetties, warehouses, and boatyards in order to participate in maritime trade.

This perspective on ports focuses on its economic fabric, not without reason considering their role. It is predicated on Westerdahl’s (1992) innovative maritime cultural landscape concept, which represents “human utilisation (economy) of maritime space by boat: settlement, fishing, hunting, shipping and its attendant sub-cultures.” The maritime cultural landscape is thus a visualisation of people’s relationship to the sea, in particular with regard to economic exploitation. Many of Westerdahl’s definitions of the concept focus on seafaring, for example a later one in a paper about roads and sea routes describes it as the “network of sea routes, with harbours and related constructions and remains of human origin, below as well as above the water” (Westerdahl, 2006). Maritime enclaves are thus the nodes of this network, where maritime culture comes about and a concentration of “constructions and remains” are found. Much of Westerdahl’s discussions still focus on economy and transport, because “their occupations […] to a large extent define their culture” and “living in an ecological niche leads to an adaptation precisely
to that niche” (Westerdahl, 2007). Indeed maritime, riverine, and lacustrine environments tend to develop a culture of transport and communication characterised by rapid transmission of information and spatially extended networks (Westerdahl, 1999, 2006). Thus, taking a maritime cultural landscape approach—as Westerdahl defines it—helps highlight the adaptations specific to maritime environments and maritime activities.

This approach however risks overemphasizing the economic role of trade in the development of ports, to the detriment of social and cultural factors. As has been reiterated throughout this paper, ports are very diverse spaces by virtue of their need and ability to attract merchants from all over the world. Along with goods to trade, these merchants bring with them their culture: their beliefs, their values, their lifestyles, their tastes in food, clothes, and architecture... The interaction of people from different social and geographical backgrounds, all of whom are trying to maintain their identity, is reflected in the built environment.

Adam Rogers (2013) argues for a more social approach to port and harbour archaeology, as he believes that studies of ports have focused too often on how changing technologies (including the characteristics of ships) and commercial trends have impacted the design of harbours. Paralleling Rapoport and Westerdahl, Rogers brings up the concept of “taskscapes,” explaining that the environmental context of ports, the waterfront, dictates the type of activities people engage in, which in turn influences the shape of the port (Rogers, 2013). He however goes beyond this idea by reminding scholars that “by their nature and function, the connection [of ports] with places across water and overseas means that they could often attract a large range of different peoples with varying perspectives” (Rogers, 2013). He proposes drawing from the domestic
architecture discourse as one way of highlighting the diversity of people living in ports but points out that in a port setting, it might be difficult to separate “domestic” and “business” (Rogers, 2013). Environment-behaviour theory does not necessitate such a distinction, which is why it is well suited to the study of ports.

As stated above, Rapoport’s environment-behaviour theory posits that certain aspects of culture, lifestyles and activity systems, are observable in the built environment. He states that in order to understand culture fully in built structures, it is the “latent aspect of activities,” meaning, which must be considered (Rapoport, 1998). This meaning is connected to values and social variables such kinship, gender, social roles, and status, and is transmitted through symbolic codes; it is thus reflected in the choice of things like colour, material, and spatial organisation (Rapoport, 1998). Rapoport (1998) illustrates his point with the example of the kitchen: food preparation varies greatly across cultures, it is also related to other activities and meanings (for example rituals, familial ties, gender roles), all of which affect the design of the kitchen and location within the house. In short, buildings reflect the wants and needs of its users in their structure, layout, and decorative elements. As lifestyles are expressed in the built environment, maritime culture is expressed as “a recurrent set of maritime traits and repetitive maritime behaviour,” which is visible in the archaeological record (including the built environment) (Mushynsky, 2011). David Tuddenham (2010) puts forward the concept of “maritimity” to help guide studies of maritime culture. This concept is based on the idea that material culture is rarely either maritime or terrestrial, rather somewhere on a scale between the two. In order words, determining maritimity asks “how maritime is this?” It is however “to be understood as a category of understanding, not something with empirical qualities,” the
same way that thinking of life modes, activities, and social variables helps understand (maritime) culture (Rapoport, 1998; Tuddenham, 2010; Westerdahl, 2007).

The maritime cultural landscape approach in conjunction with the environment-behaviour theory provides a conceptual structure with which to understand the fabric of Southeast Asian port cities, and in particular how maritime trade influenced their development. It is clear that the economic and technological aspects of trade highly dictate the use of space. Their reason for being and their continuing success hinges on the efficiency with which merchants can participate in regional and/or global trade. On the other hand, it is important to continuously remember that around the ports grew towns built by foreign people. In order to understand a Southeast Asian port, one must consider how the Chinese, or European, or Indian trader experienced the setting and how (or if) they maintained their identity.

The Development of Hội An

The practical application of the above approach can take many forms by focusing on different aspects and characteristics of the port in question. For example, one could look at community-specific trade practices, the way they were adapted to function in a foreign port, and the way they may have been expressed in specialized structures. Another avenue of enquiry would be to compare the inns and hostels of different communities within a same port. Westerdahl sees inns as a major feature of the maritime cultural landscape, acting as relay stations and safe havens in an emergency (Westerdahl, 2006, 2007). The Chinese, Japanese, British, and Indian people of Hội An and George Town had similar institutions that served as accommodation and aid for visiting members of their communities. Though a cross-cultural study would more fully address the
question of cosmopolitanism, this paper will focus on a single foreign merchant community. It will analyse the public buildings and residences of the Chinese merchant communities in Hội An and George Town in order to understand the impact of trade on its lifestyle.

The overseas Chinese community represents a large group of migrants in Southeast Asia, who have played important roles in the history of the region since the third century before the Christian Era (Mackie, 1996; Wu, 2010). It is composed chiefly of groups from the southern provinces of China, especially Fujian and Guangdong. Due to the mountainous geomorphology of their home, the inhabitants of this region did not establish very strong ties with Central China, instead turning to the sea and developing mercantile and fishing activities, and later being highly involved in regional and global trade. In addition, population pressures such as poverty, war, and disease, resulted in migration towards Southeast Asia, in particular after the Qing conquest of the Ming in 1644 and in the second half of the nineteenth century as a result of the two Opium Wars (1840–1842, 1858–1860) and the Taiping Rebellion (1851–1864) (Wu, 2010).

The Chinese communities living in Hội An and George Town immigrated at different times and for different reasons. The first Chinese to arrive in Hội An after its establishment were highly involved in maritime commerce, either as traders themselves or running businesses to support trade (Chen, 2002). This was a relatively small group, outnumbered by the Japanese until the mid-seventeenth century. The Togukawa policies of the 1630s prevented Japanese nationals from leaving Japan, leaving a vacuum in Hội An which was quickly filled by the Chinese (Wheeler, 2001). Furthermore, a substantial number of Ming loyalists sought refuge in Hội An in 1644; they were given a special status, Minh Hương, which
allowed them the right to own land, marry local women, and hold office (Chen, 2002). The height of Hội An’s success, the eighteenth century, coincided with what Anthony Reid (1993) and Carl Trocki (1997) refer to as the “Chinese century” when the Qing rescinded the Ming trading bans and breathed new life into the junk trade. Contemporary visitors to Hội An often describe the town as a Chinese town, and comment on the affluence of their neighbourhood (Chen, 2002; Morel, 2010; Wheeler, 2001). The exact number of Chinese living in the Nguyen port is unclear: Thomas Bowyear counts around 100 Chinese households in 1696; an anonymous source counts 6,000 Chinese in 1744, while another estimates 10,000 “married and tax-paying Chinese” in 1750 (Chen, 2002; Dalrymple, 1791–1797).

The bulk of Chinese immigration in Penang takes place over a century later, during the decline of the junk trade and the integration of Chinese merchants into the global capitalist system (Wu, 2010). The majority of Penang’s early Chinese migrants in fact were not from China but from the Malay Peninsula, mostly from Kedah (Hussin, 2009). Only the wealthiest Chinese participated in trade, as owners of shop, shophouse, and ship or members of mercantile companies, while the majority worked for wages as skilled, semi-skilled, and unskilled labour (Hussin, 2009). Along with the Indian community (Chulias), the Chinese community formed the bulk of George Town’s population; the number of Chinese grew steadily in the first decades of the nineteenth century, overtaking the number of Indians in 1828 (Hussin, 2009). Both communities dominated the commercial centre bounded by Light Street, Beach Street, Chulia Street, and Pitt Street (Hussin, 2009).

Despite these inceptive differences, there are many similarities in the Chinese settlements in Hội An and George Town, particularly with regard
to economic and cultural institutions. The first thing to note is that the “Chinese community” in both these ports was in fact several communities, dictated by clan or hometown, each with distinct traditions and languages (Hussin, 2009). Often, they would create associations, guilds, or societies according to dialect or family name, which provided a sense of comfort and belonging to its members. This institution has purely economic origins in fifteenth century trade guilds that helped regulate business abroad (Moll-Murata, 2008; Naquin and Rawski, 1987; Purcell, 1965; Wu, 2010). The associations in Southeast Asia, named kongsi, provided lodging and a meeting space for visiting merchants, and offered assistance to new settlers, but also served as a storage facility and as the custom house (Naquin and Rawski, 1987). Oftentimes, they would take on the role of a municipal government for the local overseas Chinese population, providing fire-fighting, policing, and schooling services, as well as maintaining public infrastructure (Moll-Murata, 2008; Naquin and Rawski, 1987; Wu, 2010). At the end of the 19th century, the kongsis lost their economic and regulatory roles, instead becoming hui guan: common-origin associations and public assembly places that promote history and traditional knowledge (Moll-Murata, 2008; Wu, 2010). The institution is made concrete in the form of assembly halls and clan houses that are considered symbols of their community, reflecting unity, loyalty, and prosperity.

In Hội An there are five Assembly Halls: four common-origin guilds (Fujian, Guangdong, Teochew, and Hainan) and the Trung Hoa guild that brings together all the Chinese communities; the latter was originally established as the Dương Thương guild, the guild for Maritime Commerce (Chen, 2002). It is notable that an association intended as a professional guild for the main economic activity of Hội An later came to be a pan-
Chinese cultural space. In addition to accommodating travelling merchants and drafting an ethical code of conduct in trade, Dương Thương hall contained a shrine to the Goddess of Mercy², the patron of fishermen and sailors, and the first deity for whom overseas Chinese would erect a shrine after sailing away from home to settle in a new place (Chen, 2002; Purcell, 1965). Today’s Trung Hoa Assembly Hall still maintains the shrine, which now also contains a model of a Chinese junk.

There are some 170 Chinese associations in George Town relating to clan or dialect; some are headquartered in shop houses, such as the Ch’ng Si Soo Bee Tong (now Persatuan Zhuang & Yan Pulau Pinang), though most are housed in grand hall such as Lim Kongsi. The Lim clan had been trading in Penang since 1821 and established their clan house in 1863 on Beach Street, the busiest commercial street of George Town, located on the waterfront until the reclamation projects in the 1870s and 1880s (George Town World Heritage Incorporated, n.d.; Langdon, 2015). Like the Dương Thương in Hội An, Lim Kongsi pays tribute to the goddess of seafarers. She is a recurrent figure around George Town, including at Kuan Im Teng temple, the oldest Chinese temple in Penang built in the eighteenth century.

The associations and halls are a public expression of the Chinese merchant identity. In the above examples, the sea plays a clear role in the way the community both views itself and connects with each other. As a community of seafarers, the sea represents to the Chinese merchant group a connection and a divide from home, yet it is also their livelihood. The central role of maritime trade is further illustrated in Hội An and George Town’s predominant style of housing: the shophouse. As its name suggests, the shophouse is both a commercial and residential space. The shop is located at the front of the building, opening on the street, and is
generally larger than the residential part, which is located in the back or on the top floor. In Hội An, the shophouses are built as near as possible to the water to facilitate loading and unloading from ships. Though the basic layout remains the same, the materials and ornamentations varied slightly from Hội An to George Town. The Hội An shophouses were mostly built from an incredibly strong local wood called *tin* (ironwood); the early George Town houses had *attap* roofs, while the later houses were built of burnt clay bricks (Dror and Taylor, 2006; Hussin, 2009). The houses in Hội An were also built with flooding in mind, as the river was known to overflow during the monsoon; they had removable boards and pulley systems to protect goods (Dror and Taylor, 2006; Morel, 2010). The façade of shophouses in George Town very distinctly reflected the ethnicity of its owner through ornamentation: “carved wood panels and fascia boards of the indigenous and Indo-Malay, elaborate and superstitious images of the Chinese, the arches of Mogul India, the neoclassical elements of British architecture of the Georgian and Regency periods and the modernism of art deco and modern architecture” (World Heritage Site Special Area Plan SAP §A4.11.8).

**Conclusion**

This analysis of Chinese public and private buildings in Hội An and George Town has helped understand one aspect of the fabric of Southeast Asian ports. The overseas Chinese merchant community was a significant presence throughout the region and thus highly impacted both its economy and society. However, this study has also shown that their seaward migration and activities in trading has impacted their lifestyle and culture. The built environment reflects the dual relationship of this group with the sea: there is a preoccupation with efficiently utilizing it for
trading and an understanding of it as something that both separates and connects them to the homeland.

The theoretical approach outlined in the first section of this paper considers the port both as part of the maritime cultural landscape and as a maritime cultural landscape in and of itself in order to visualise how the economic and technological aspects of maritime trade impact its form and development. It also proposes focusing on the built environment in order to draw out the characteristics of a cosmopolitan port culture, based on the idea that trade forces cosmopolitanism, that is the coexistence of various cultural groups in one space. The reverse relationship has not yet been investigated. With the same approach, it may be possible to visualise how cosmopolitanism impacts trade (the same way it impacted architecture as seen in the evolution of shophouses in George Town), where the specialised trade structures (wharves, warehouses, customs…) would reflect adaptations to new environments and new people.

Endnotes
1Hội An also fits criterion (v): to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change.”
George Town also fits criterion (iii): to bear a unique or at least exceptional testimony to a cultural tradition or to a civilisation which is living or which has disappeared;” and criterion (iv): to be an outstanding example of a type of building, architectural or technological ensembles, or landscape which illustrates (a) significant stage(s) in human history.”
2Known in different contexts as Mazu/Matsu, Tianhou, (Thiền Hậu in Vietnamese), or Guanyi (Kuan Im in Penang)

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World Heritage Site Special Area Plan SAP §A4.11.8

Abstract

The British bark Larpent left Liverpool for the Far East in May 1850, and was lost in the China seas the year next. Three of its survivors were rescued, and both Great Britain and the United States sent agents to search other possible survivors in Taiwan. The efforts of the British and the Americans have produced a bundle of information about the sailing issues near the island. The paper will explore these materials, and in the meantime, trace the few earlier European observations about the sailing conditions by or around the island, such as the records Lord’s Anson’s and De la Perous’s voyages. The Larpent event, in fact, has something to do with the overturing of lighthouse building in and around Taiwan Straits in the second half of the 19th century. By studying the sailing facilities in the Taiwan area before the mid-nineteenth century, the paper will also trace back the pagodas and old-style lighthouses used by the Chinese to guide navigators in the 16-18th centuries.

Key words: Taiwan, sailing, structures

Introduction

In 1883, the Eluanbi (South Cape) lighthouse started to work. It greatly helped improve the safety of navigation in the vicinity of that area. Most researches on the causes of its construction emphasize the effects of two events. They believe that the shipwreck of American bark The Rover brought up the issue of the necessity of building a lighthouse in South Cape of Taiwan, and then, another event happened in 1874 created the
conditions of so doing. Such reasoning is, in fact, not quite in accordance with historical facts. The reason of appealing for a lighthouse lies prominently in the frequent shipwrecks occurring in the neighborhood of Southern Taiwan about 1850 and thereafter.

The reasons of incessant shipwrecks were like these: (1) Exportation of Chinese laborers to America. Great Britain abolished slavery in 1833 produced a vacuum of working force, and Chinese laborers were sought to fill the gap. From 1845 onwards, the British firm Tait & Co., basing on Amoy, commenced to ship out coolies to South America. A few years later, gold mines were discovered in California, and the need of laborers was enhanced. In consequence, shipping between China and America grew phenomenally.¹ (2) Another reason is, even before the opening of treaty ports in Taiwan, foreigners eagerly sought commercial opportunities down there. Even it was not legal at all, more and more foreign vessels came to Taiwan for trade, and even tacitly permitted by local officials.² (3) A third reason is that in Northern Taiwan, in the area of Keelung, coal was abundant. Foreign steamers came to refill their tanks or just ship off coals for profit.

While shipping increased, number of shipwrecks naturally grew up. It is the reason of navigational disaster that made the necessity of some sorts of navigational aids apparent. Thus the captain of the Science, an illegal trading ship operating in the harbor of Takao (nowadays Kaohsiung), went into an agreement with the Circuit Intendant (Taotae) of Taiwan in written document. In that agreement, the Intendant “permits him to place lights at the entrance of the port on a flag-staff erected for such a purpose, and station buoys on the bar.”³

This is the earliest instance of erecting lights in a Taiwan port at the urge of foreigners. In addition to the “lights”, “station buoys” were also
consented to set up. However, such kinds of port facility to render aids to shipping vessels were not entirely new to Taiwan. Therefore, the Intendant was not reluctant to give his permission. Before the first modern lighthouse (the Xiyu Pagoda Light or the Fishermen’s Island Lighthouse) was built up in Taiwan region, there were already two predecessors: one stood in the very site of the Xiyu Pagoda Light, and the other in the estuary of Tamsui River on Northern Taiwan. As for buoys, probably due to the influence of the Dutch occupation in the period of 1624-1662, the harbor of Taiwanfu (Tainan) was provided with lines of spar buoys to guide the operators of vessels. The buoys were called “dangying,” and recorded in many sources. “Dangying” means “swinging tassel,” describing the motion of spar buoys in the waters.

Anyway, in the second half of the 19th century, records of shipwrecks were plenty. Giving some examples, there are the wrecks of the Kelpie (1848), Sarah Trottman (1849), the Larpent (1850), Lady Evelyn (1853), The Rover (1867), and so on. A detailed list can be made with the data provided by James W. Davidson (1872-1933). According to this authority, between 1850 and 1894, some 90 ships encountered bad lucks, two on average each year. During this period, Taiwan was bestowed an embarrassing name – the “Inhospitable Shores (Coast).”

In the unfortunate The Kelpie, there was Thomas Nye on board. His cousin Gideon Nye (1812-1888) was a famous (or infamous) China trader of those days. Gideon pressed very hard to the Chinese authorities for rescuing his relative, but to no avail. In fact, none of the survivors of the Kelpie was found, and the whereabouts of Thomas Nye was uncertain. It had to wait for a few years when three survivors of the Larpent made their appearance in Shanghai that aroused a general concern among the westerners.
The Larpent Event and Aftermath

The Larpent event has been quite well told in James W. David’s book about half a century after the tragedy. However, supporting by more complete sources, we are now enabled to enquire into much more details. The new data come from different corners. First, the survivor’s testimony reported in the Treaty Ports newspapers, including the Hong Kong Register and the North China Herald, etc. Second, the men sent to Taiwan to distribute rewards to those who had helped the wreckers and to get information about any other detained foreigners. The British bark Salamander took them to Taiwan. Among the people involved, Mr. (later Sir) Harry Smith Parkes (1828-1885) was present as the interpreter. Although he did not publish his own observations, the Salamander's officers did have their reports. In the meantime, the American envoy to China, the Rev. Peter Parker, also caused a Chinese agent to be sent to Taiwan for information gathering, and this man’s report was translated into English and available to concerned parties. A couple of years later, when the British vessel the Inflexible was ordered to go to Taiwan for conducting a coastal survey, Robert Swinhoe (1836-1877) was on board to interpret. He and Inflexible's captain, as well as the assistant surveyor, all had their reports. Adding to that, we will also make use of the U.S. government papers for documentation.

Here follows is a concise summary of the Larpent's story. The Larpent was built in Moulmein, Myanmar, owned by a Mr. Thomas Ripley. It left from Liverpool on May 18, 1850, commanded by Captain Gilson. News of its anticipated arrival at Shanghai appeared times and again in the North China Herald. But ultimately it failed. After a voyage of 116 days, it came to the waters off Island Botel Tobago near Taiwan. The waves and surfs were not heavy, and the sky was somewhat clear. Unexpectedly, it ran
aground on the edge of Southeastern Taiwan coast. The captain and seven others took the gig, while the 23 rest crews took the long-boat to escape. Later on, the gig was lost. The long-boat, after many hazards, reached a Sugar-loaf Rock in the southern tip of Taiwan. The men on board started to land, but were shot by the natives with matchlocks. Some of them died on the spot, and the rest were forced to disperse. They were not heard for about eight months. Then, in the beginning of May, 1851, three survivors were rescued by an American vessel, the Antelope, and brought to Shanghai via Hong Kong. The British consul at Shanghai, Sir Rutherford Alcock (1809-1897) took the matters into his own hands. In the meantime, the Shanghai foreign community also took some steps to help the survivors.  

The story of the unfortunate Larpent was duly taken down and published, not only in the North China Herald based on Shanghai, but also in the Canton-based The Chinese Repository. In consequence the news was widely circulated in the treaty ports along the China coast. Therefore, when Charles Shaw stood out to raise funds on behalf of the crew of the Larpent, many people came forward. In a few days, a sum of 865 dollars was collected. A list of the contributors is available from the pages of the North China Herald. The British decided to dispatch the steam boat Salamander to Taiwan, with part of the money raised for distributing to the good-hearted Taiwanese. Apart from Harry Parkes, there were Captain Ellman and Lieutenant Lambert on board. Surprisingly, an unnamed employee of the Tait & Co. also went along together. His purpose is obscure. As for the rescued survivors of the Larpent, two (Alexander Berries and William Blake) also joined the mission. The last one, James Hill, being indisposed, was absent. With some difficulty, the Salamander got a pilot en route in the Pescadores and dropped anchors between
Xiaoliuqiu Island (the Lamay Is.) and Taiwan mainland. Some of the members successfully landed on the coast of Fangliao (“Pongle” as appears in the source materials) by a bamboo raft. They were informed by local people: it is most advisable to pay a visit to a person by the name Lin Wanzhang (Wancheang, or Bancheong). He lived not far from the landing place, and he wielded strong influence upon the aborigines in the neighboring area. An appointment was duly made and the two parties met in Lin’s residential compound in Neiliiao (or Lailiao), just a few kilometers away.

From the conversation, it is confirmed that Lin Wanzhang did know the case quite well. Lin admitted that he had seen Blake and Hill in person in March of the same year (1851). He said he would have helped the two to get free but their master wanted them to stay a bit longer, arguing that if they stayed longer they would learn that his villagers were different from those who attacked them and killed their companions. Blake and Hill escaped later with the assistance of Berries and his master. Lin pointed out straightforwardly that the tribe who had committed the crime was Koalut. It was a small tribe of about 200 people. Out of them, only 60 or so could fight. Had it not been there were in want of consensus among other villagers in the area, it would have been crashed. He added that if the British party wanted to attack the Koalut, he could provide at least 400 matchlock-men. Thereafter, Lin Wanzhang sent a subordinate to accompany them to Langjiao for giving out the rewards. Lin also wrote a letter for them to be delivered to a “towkay” (headman) in a village near Langjiao.
The *Salamander*’s men arrived at Langjiao on August 17, 1851. On the next day, rewards were distributed through the hands of Berries and Blake. A man by the name Kewah or Kenah received a large share ($225), because he was the very person who made the final stage of their liberation and escape possible. Kewah’s relative Chako received $50. He was quite handsomely rewarded because his wife gave Kewah the information of Berries’s detention. Chako’s wife was an aborigine woman whose village had detained Alexander Berries before Kenwah ransomed him. Some others had also given hands to the *Larpent*’s survivors and were duly rewarded. The village head of Sheliao (near Langjiao), who Lin Wanzhang wrote to, was given some money, too. He was said to have some influence on “the wilder tribes”.12 As for the information about any other shipwrecks and possible survivors, the *Salamander* team was not able to get solid information. The *Salamander* then went to the South Cape for surveying the Koalut area, and finally returned to Shanghai.
More than one decade later, Sir Harry Parkes made a statement in the meeting of the Royal Geographic Society. Though his memory is not completely sound, he did give a short account about the mission:

“The South Cape was about the very worst point for a vessel to get on shore; for on that extreme point of the island there was a particular aboriginal tribe, numbering 200 or 300 individuals, who had an unfortunate passion for human heads, and it was a habit with them to murder any foreigner that came in their way. He had occasion to make the acquaintance of these people about twelve years ago, when one of our vessels were lost on that point, and he was sent over by Her Majesty’s Government to make some inquiries respecting the missing crew. They succeeded in rescuing two of the men, who were in the hands of another tribe on the western point, the wreck having taken place on the eastern point of the said Cape. These two men had been bought by the Chinese at 6 dollars a head, and had been in captivity with them six months.”

As Harry Parkes was the interpreter, he was responsible for transmitting the information. However, probably time weakened his memory, he made the mistake to say only two men were rescued. Probably he was confused by the fact that only two out of the three were accompanying the Salamander to visit Taiwan. The money paid for ransoming those men was seven dollars each for Hill and Blake, although Berries was six. Blake and Hill were detained by aborigines for 4 months (not 6 months) and then purchased by a Chinese, who kept them with him for another four months until they escaped to Berries’s place. Berries’s master (Kewah) then arranged them to reach the Antelope and leave Taiwan.

In the beginning, the Americans also tempted to send a gunboat to Taiwan, but after learning of the commission of the Salamander arranged by the British, they dispatched a Chinese agent, by the name Oo-sian,
instead. This Oo-sian took a Chinese junk on August 8 in Amoy and arrived at Donggang, Taiwan, in the evening of the 11th. When still in the harbor, he encountered a typhoon and lost almost all his belongings. He spent a couple of days in Donggang and then went to Neilliao (Lai-liao) to pay Lin Wanzhang a visit.

There he learned that the men of the Salamander had already been to. Oo-sian and Lin Wanzhang met on the 17th of August. The latter ascertained that there were no more Western fugitives. He himself knew the whole southernmost area well. And, he added, if there were any more Westerners in captivity, they must have been found out for rewards owing to the Salamander men had given such a promise.

Before going to see Lin Wanzhang, Oo-sian had also collected information from local folks. It was said Lin Wanzhang owned a watch, a spyglass, and a sextant, apparently from certain wrecks. Oo-sian mentioned this to Lin Wanzhang for clarification. Lin Wanzhang replied that they were brought to him by some aborigines about four years ago for sale, so he exchanged some goods for them. Sometimes later, a mandarin shew his interest in these objects and Lin Wanzhang just gave them away. Lin Wanzhang expressed that he did not know anything more about the origin of those objects.

According to Oo-sian’s report, he visited the South Bay where the attackers of the unfortunate sailors lived, then he went to some hillside places, several harbors in the southwestern coast of Taiwan, and even the Pescadores, but no more important information was gathered.14

Time elapsed for a couple of years, then, in 1858 another British steam ship the Inflexible, came to Taiwan for surveying the coast of that island. Robert Swinhoe, who later became the first vice-consul to Taiwan and
was renowned for his discovery of several endemic species of flora and fauna, was on board to render interpretive service. Swinhoe, as well as the commander of the *Inflexible* and an assistant surveyor all reported this visit.

The *Inflexible* left Amoy on June 7, 1858 for Taiwan via the Pescadores. After visiting a few harbors to distribute proclamations in search of surviving ship wreckers and seeing some dignitaries, it arrived at the road of Fangliao on June 14, 1858. The men took bamboo raft to land, and went directly to see Lin Wanzhang (spelt as Bancheang in Swinhoe’s paper). On the way to Neilhao, Swinhoe found that Fangliao was at odd then with Neilhao, but they were not molested, anyway. Upon arrival, he found there were two Chinese characters written on the door lintel, reading as “wan ke”. Douglas Fix thinks the original words for “wan ke” must be “wanji萬記” – some sort of house name –, but I would like to put it as “Fange番割” – broker with the aborigines –, which we will dwell upon a little bit more later in this paper. As the group of men from the *Inflexible* had read Oo-sian’s (spelt as Urian) report beforehand, they also asked about the instruments Lin Wanzhang once in possession, and he gave the same answer as what to Oo-sian. Lin Wanzhang added that he did not hear any news about shipwreck after the event of the *Larpent*.

**Lin Wanzhang: In the Vacuum of Government Power**

The men of the *Salamander*, Oo-sian, and the officers of the *Inflexible* all paid Lin Wanzhang visits when they came to Taiwan for finding out information about Western ship-wreckers. Then, who is Lin Wan Zhang? And, why should they do so?

Swinhoe describes his impression of Lin Wanzhang: “The Hero in his house we found, not as we expected to meet him, a dashing Robin Hood,
but a thin stooping elderly man, with bad teeth.” He also records that Lin Wanzhang was married to an aborigine woman, and guesses that Lin Wanzhang might have learned tribal language from her. In another publication, he has more about this man:

“……When circumnavigating the island in 1857, I had the pleasure of seeing a few women, who were married to Chinese at Pongle and Langkeaou. They were much browner than ordinary Chinese, and had their hair plaited and entwined with red cotton after the manner of their people, but they were otherwise dressed like Chinawomen. At Laileaou a Chinaman named Bancheang, of large landed property, traded with the Kalees of the hills, and was on very friendly terms with them. He was constantly at variance with the Chinese authorities who had outlawed him, but could not touch him, as he was so well defended by his numerous Chinese dependents and the large body of Aborigines at his beck. This man was wedded to a Kalee, but she was shy and would not show during our visit. He evidently considered himself vastly superior to Europeans, for he evinced to us none of that formal civility characteristic of a Chinese gentleman.”

Again, as we see before, Lin Wanzhang was married to an aborigine woman, and here Swinhoe describes here of the Kalee tribe. The family records of Lian Wanzhang’s descendants disclose that this woman (named Talimaraw Sauniyaw) belongs to the Paiwan ethnic group living not far from Neiliao where Lin Wanzhang resides. This is an important clue to ascertain that the words written on the lintel of his house should be “fange” instead of “wanji”. In fact, an Intendant of Taiwan, by the name Xü Zonggan, once wrote “Lin Wanzhang (is) a fange (Those who married to aborigine woman is called a fange). His family serves as Yimin for generations.” Fange was the kind of person who stood between Chinese and aborigines as liaison person, but mainly for the purposing of
exchanging materials. A *fange* was usually a Chinese, or a man descended from a Chinese father and an aborigine mother. In the latter case, he is called a *tushezai* or *tushenan*, meaning a “mestizo”.  

The commander of the *Inflexible*, G. A. C. Brooker, was not failing to mention Lin Wanzhang’s involvement in trading with the aborigines:

“One Mancheong (Lin Wanzhang) is in the habit of trading with some of the aborigines through some of his people; and he assures me, from what he knew of their fierce, savage disposition and thirst for blood, no European’s life would be spared if one fell into their hands. He says, they are more savage in some parts of the island than in others, especially in the South. I left several proclamations with Mancheong, who would have them conveyed and explained to the savages, whose language is quite distinct to the Chinese, and totally different in sound. I heard there were many Chinese settled among these wild inhabitants of the woods, and had great influence with them, because they were the means of procuring articles from the Chinese which the aborigines themselves could not obtain.”

Lin Wanzhang had proficiency in aboriginal language, traded with the aborigines, and wielded influence upon the latter, hence was a suitable person to contact. This explains why everybody directed the Westerners to visit Lin Wanzhang when they came to Taiwan for shipwreck issues.

One thing also merits mentioning. Swinhoe noticed the forces possessed by Lin Wanzhang, and could commandeer aborigines to fight for his cause. G. A. C. Brooker also observed:

“This Mancheong has upwards of five thousand men under his control, whom he employs tilling the land, of which he possesses a large extent in the neighbourhood of the hills where he resides. Consequently he commands great influence with the people, and at times sets the authority of the Mandarins at defiance, and presents so formidable an appearance that the latter have more than once retired from an attack they have made on Mancheong for the purpose of extorting money from him.”
Robert Swinhoe told a much vivid story in his report. After seeing Lin Wanzahng, they left Neiliiao and passed the village of Fangliiao where they called upon the tiny military officer stationed there. Swinhoe found the Chinese officer and soldiers were much afraid of Lin Wanzhang, because they were defeated by him not long times ago. According to Swinhoe, the Chinese authorities sent an army of a thousand men to invade the area under Lin’s control. When they came near, “Bancheang himself loaded a gun and discharged it at the invaders, knocking over eighteen men at one discharge. The Imperialists were bewildered and immediately made good their retreat…”

The event described by Swinhoe happened in 1855. Why the authorities had taken troubles to attack Lin Wanzhang? It is not clear, but we can guess. In the previous passages, we cite Xü Zonggang’s description about this man. Xü Zonggang wrote in his diary that the family of Lin Wanzhang “serves as Yimin 義民 for generations.” “Yimin” (literally “righteous person”) were those men who stood on the government’s side to fight against rebels. Lin Wanzhang did help the government in quelling some social unrest. However, he was implicated in a rebellion occurred in 1853 which his relatives got involved. He was not indicted after the 1853 event was over. Probably the authorities postponed taking action until 1855 for a better timing, although still failed. Anyway, all these facts reflect that Lin Wanzhang was too strong to be controlled.

To sum up the observations of British visitors about the person Lin Wanzhang, we have no doubt that he is an influential local bully. He wielded power over the local people in the neighborhood of Fangliiao, both the Chinese and the aborigines through his role as a fange. As he owned his own force, he was also daring to offend the authorities, even fought
and defeated their armies. Why the Qing government performed so badly then? It is because that the southernmost past of Taiwan was declared “Forbidden Land” (jindi 禁地) after a fierce rebellion occurred in 1721 and the government force withdrew from the territory south of Fangliao. Fangliao became the last point with a very small army (no more twenty soldiers) and in fact, the southernmost region was left uncontrolled by the government. Several ethnic groups of aborigines occupied that region. Although the Qing government prohibited and dissuaded Chinese to enter into that region, it was not successful at all. As a result, besides the aborigines, there were other ethnic groups consisting of Fujianese Chinese, the Hakkas, and identifiable mestizos. They also took on their own hands to protect their own interests. Lin Wanzhang was one of such ethnic leaders, and probably the strongest. This explained why he was named to visit by local informants to western visitors.

**Shipwrecks and the Safety of Survivors**

However, it is still quite a distance from Fangliao to the very end of the Island. On the area near the southeast tip of Taiwan lived the Koalut tribe who was accused by Lin Wanzhang and others as the bloodthirst killers of the wreck survivors. Although Lin Wanzhang boasted that if the British wanted to attack that tribe, he would be happy to provide more than 400 men with matchlocks, no party was interested so to do at that moment. Later on, in 1867, due to the incident of the wreck of the American bark the *Rover*, Le Gendre – U.S. consul at Amoy – came to Taiwan. He was successful to reach an agreement with the common leader of the league of aborigines in the southernmost region, Tok-e-tok. Killing or harassment against ship wreckers did not happen again, at least in the area under Tok-e-tok’s sway. But there was still another issue waiting to be solved. It is the improvement of sailing security.
The most dangerous threat to navigation is the Vele Rete Rocks. The group of rocks and shoals lie about 10 kilometers south of the South Cape (the southeast corner of Taiwan). Citing the result of Capian Ross's investigation, James Horsburgh has the following description about the Vele Rete Rocks:

“This is a mass of rocks, several of them a little detached from each other, and even with the surface; some of them are above water, and may be seen 9 or 10 miles. The channel betwixt this danger and the South end of Formosa, is about 4 leagues wide, and very safe. But very turbulent ripplings are often experienced in this, and the neighbouring channels, which Capt. Ross observed to extend in a N. E. and S. W. direction, and running so high, that the breakers resembled the sea beating furiously over a dangerous shoal.”

It is confirmed that the Rover broke up on the Vele Rete Rocks and the unfortunate survivors were murdered by the Koalut. The landing place of the survivors was in Dawan (now the famous resort of Kenting) within the sphere of the Koalut. In the time of Le Gendre, what occupied his thought was the safety of the survivor, not the navigational security. In consequence he pressed hard to the Chinese authorities to build up a fort in the southwestern tip of the southern end of Taiwan (now called Maobitou). Although the idea of a lighthouse to guide the sailors existed in his mind, he did not emphasize the importance and the urgent need of such a construction. Although Robert Hart, in cooperation with the Qing government, started to launch lighthouse-building along the China coast in 1867, a lighthouse in the neighborhood of the Vele Rete Rocks was not in his plan.
The construction of a lighthouse in the southern tip of Taiwan still had to wait for decades. In 1874, the Japanese invaded Taiwan in excuse for revenging on behalf of the Ryukyuans, whose compatriots were killed after a shipwreck in 1871 by the tribes a bit north of the former league under Tok-e-tok. In the negotiation between China and Japan, the question of navigation safety was raised, and setting up a lighthouse was brought forward. One year after, it started. In January 1875 the engineer-in-chief of the Customs, David Marr Henderson, trekked to the Southeast tip for a survey. Thereafter, Michael Beazeley, an assistant engineer of the Customs in Takao (Kao-hsiung), went to the South Cape to purchase a piece of land for the use of erecting a lighthouse with local chieftain. The place he acquired, he pronounced, is Wo-lan-pi, now styled as Eluanbi. A temporary screw-pile lighthouse was erected soon after, but the permanent one took a long time to come out. When the lighthouse was first lighted in 1883, it turned out to be an unusual, fortified lighthouse.
Its chief engineer John Reginald Harding had in fact called it a “fighting-lighting machine”. Navigation security and personal safe were all taken into consideration in designing and building the lighthouse. What can do better?

Endnotes


4 Please see Stephen Davies’s wonderful paper for this conference: “China’s first purpose designed and built lighthouse: findings from the analysis of a long lost but recently rediscovered photograph of the Xiyu Pagoda Light (李西山塔晚燈, Lixishanta Wangdeng)”. 


7 For example, the commander of the American fleet in China, Captain W. S. Walker, wrote to U.S. chargé d’affaires Peter Parker, reporting the British motion after hearing the case of the Larpent on July 14, 1851. In that letter, Captain Walker writes: “any of the missing vessels (of whatever nation) having been wrecked on this inhospitable coast….” See Jules Davids ed., American Diplomatic and Public Papers: The United States

8 James W. Davidson, The Island of Formosa: Past and Present, pp. 110-112.


11 Mr. Shaw is one of the proprietors of the Shaw, Bland and Co. Cf. The Chinese Repository, vol. 15, p. 8.

12 The Nautical Magazine and Naval Chronicle, October 1851, pp. 520-525, “Salamander’s Visit to Formosa.”


14 Oo-sian’s report was translated and published in the July 1851 issue of The Chinese Repository, pp. 490-492. It seems available to many interested persons. In G. A. C. Brooker, “Journal of H.M.S. Inflexible on a Visit to Formosa in Search of Shipwrecked Seamen,” in The Nautical Magazine and Naval Chronicle, vol. XXXVIII, no. 1 (January 1859), pp. 9-11, a “Translation of a Report by Urian, who was sent to Formosa by the United States Consul at Amoy, to search for missing Europeans” is also included. The content is almost the same with a little variance only. However, for unknown reason, Oo-sian was spelt as Urian.


16 費德廉(Douglas Fix)、羅效德編譯，《看見十九世紀臺灣——十四位西方旅行者的福爾摩沙故事》（臺北：如果出版，2006），pp. 21-22.

Swinhoe makes the mistake to record it in 1857, in fact, it was taken place in 1858.


“林萬掌，番格也（娶番婦為室，謂之番格），世為義民。” See Xü Zonggan’s “Diary of 1853” in his Suweixinzhai zalu 斯未信齋雜錄 (Taipei: Bank of Taiwan, 1960), pp. 84-85.

See Kuo-tung Ch’en, “Chinese Frontiersmen and Taiwanese Tushengnan in the Local Economy of Taiwan before 1900,” in Wang Gungwu and Ng Chin-keong, eds., Maritime China in Transition, 1750-1850 (Wiesbaden: Harrassowitz Verlag, 2004), pp. 139-149.


James W. Davidson, Formosa Past and Present (London and New York: Macmillan, 1903), p. 115. In the letter from Anson Burlingame to William H. Seward, Secretary of State, U.S.A. (Peking to Washington, April 23, 1867), it is clearly stated that the place of tragedy is “evidently the Vele Rete rocks.” See, United States Department of State, Executive documents printed by order of the House of Representatives, during the second session of the fortieth Congress, 1867-'68, China, pp. 477 and 499.
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Biography

Kuo-tung CH'EN received his Ph.D. degree from Yale University in 1990, is now affiliated with the Institute of History and Philology, Academia Sinica. His previous publications in English, among others, include: The Insolvency of the Chinese Hong Merchants, 1760-1843 (Taipei: The Institute of Economics, Academia Sinica, 1990), etc. His works in Chinese language are three books, in addition to several papers on the Chinese practice of bottomry loan (marine insurance), Chinese adoption of Vietnamese terms for sandbars, sea routers and landscape guide for Chinese mariners, observations on underwater archaeology, and so on. He is at present working with Paola Calanca of EFEO in a Taiwan-France joint project: “Maritime knowledge for China Seas”. The main themes include: Nautical and navigation knowledge, Port governance and infrastructure, and Seafaring language.
Conservation of Maritime Cultural Heritage: View from the Angle of Quang Ngai Province (Vietnam)

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Abstract

Quang Ngai is a province located in the South Central Coast region of Vietnam, on the coast of the East Sea. It borders Quang Nam Province where has famous Cu Lao Cham shipwreck in the north and Binh Dinh Province in the south. It has a long coastline of 129km and wide territorial waters of 11.000km2. Quang Ngai has 6 seaports which are favorable for maritime transport and trade. The Ly Son Island of Quang Ngai province is located on the north-south waterway transport of our country, which is also the East-West international trade route in ancient times. The continuous discovery of shipwreck relics in the seas of Vung Tau, Binh Chau commune, Binh Son district, and Ly Son Island in recent years has demonstrated that the potential of maritime cultural heritage in the sea of Quang Ngai is enormous and rich. However, such precious heritage now is in danger of being undermined by the illegal exploitation of some local fisherman. In the context of our current status of underwater archaeology, the necessity of carrying out the studies, protection, conservation and promotion of the value of this important heritage resource is a major issue being faced by professionals and heritage managers. This article refers to the issues of preserving and promoting the value of maritime cultural heritage in Quang Ngai province, in order to serve for the exhibition in place and development of tourism as a new approach.

Key words: conservation, underwater cultural heritage, shipwreck, promotion of the value, tourism.

Introduction
Vietnam is located on the peninsula, one side adjacent to the East Sea, having a long coastline of 3,260 kilometers with many islands and islets spreading along the country, making this S-shaped piece of land become the great crossroads of civilizations from ancient times. Here, on this land, we realized the formation and development of the cultures, the integration and acculturation, interference, convergence and the spread of Vietnam to the world and the world to Vietnam by the sea route, although many people supposed it simply as a cultural convergence. From East Asia to Southeast Asia, from the Middle East to India, even *Early modern* Europe, the age-old history of the Vietnam sea and island culture has demonstrated that interference. Therefore, the study on the value of maritime cultural heritage of Vietnam is extremely necessary for peeling the depths of cultural values, reaching the awareness and deeper assessment. Such jobs are supposed to consume so much effort and time.

In 2000, after the Vietnam Salvage Company (VISAL) finished the phase 1 excavation of the ancient shipwreck at Cham island, while many protection measures have been applied to this ancient shipwreck relic, many people have still carried out illegal tapping.¹ In 2003, the Government of Vietnam allocated to the Doan Anh Duong Salvage Company participating in the polls, surveys and excavations of ancient shipwrecks in many sea areas of Vietnam. In 2012, the 700-year-old ancient shipwreck was discovered in the sea area of Vung Tau, Binh Chau commune, Binh Son district, Quang Ngai province. The excavation of this ancient shipwreck, in association with the continuous discoveries of more other shipwrecks in this sea area led to the need to study methods of preservation, conservation and promotion of underwater cultural heritages here.
Vietnam Sea and Islands Cultural Heritage

Regarding the sea and island culture of Vietnam, it is impossible not to mention to the material and intangible culture of Vietnam's coastal areas. Right from the Neolithic, the scallop culture in the coastal areas of Vietnam appeared, bearing many special characteristics as well as general features of East Asia and Southeast Asia. Bau Du culture, Da But culture, Thach Lam - Thach Lac cultures ... have provided valuable material on the mode of living, economic life, culture and spirituality of prehistoric man through the landscaping tools and their habitats. By the Bronze Age, a variety of cultures and places belonging to the great cultures such as Dong Son, Sa Huynh, Oc Eo was found and studied through out from the North to the South, including Dau Ram (Quang Ninh province), Hoa Loc (Thanh Hoa province), Bai Coi (Ha Tinh province), Binh Chau, Long Thanh (Quang Ngai province), Can Gio (Ho Chi Minh City).

Despite these examples being modest in comparison with the material provided from archaeology, these findings also help to realize the tremendous values and clarify the genealogy of Dong Son culture in the Delta and the northern plains and Sa Huynh. All cultures and locations mentioned above have characteristics from the culture of sea area, containing many elements of sea and islands culture, but also bearing many elements of the delta, even the narrow region as the Central of Vietnam. Coastal heritage also includes the system of ports and subports, existing at least from the ages of Dong Son - Sa Huynh - Oc Eo (from the 7th BC to 1st-2nd AD) until the 18-19th centuries with relics such as Lach Truong, Bai Coi, Hoa Diem, Go Que and etc to Van Don, Hoi Thong, Thanh Ha, Hoi An, and Nuoc Man...
Studying the seaport system in the historical process of Vietnam for identifying the proper role and position on the international maritime route is a confirmation on the location of S-curved coast of Vietnam on the map. Those ports and sub-ports were extremely important in commercial activities. They are not only the place to import goods, but also a haven for international sailing through the East Sea to take on fresh water and food, and avoiding storms, and pirates.\(^5\) Heritage on the coastal, island and archipelago areas of Vietnam include the temples, pagodas and shrines where from the Ly - Tran dynasties. Buddhism, which was considered as the state religion at that time to carry out a part of the People’s Defense strategy, along with the army defending the borderland, including islands.

Right from the feudal, it is reported by the ancient people that O Cap (Vung Tau province today) earned living from finding properties under the ship sank. Over twenty years, Vietnam has unearthed "Fire fighting" 6 ancient shipwrecks. They are the merchant ships which passed through the Vietnamese’s seasore from Vietnam oversea, but had sunk because of currents, storms, or fires. However, these are very small numbers compared with the information we learned from the field through material culture and from the retrospective information of the fisherman\(^6\).

After Hon Cau, X coordinates, the Ba Ria - Vung Tau sea has also detected another two shipwrecks. Chau Thuan Bien village (Binh Son, Quang Ngai province) has a lot of shipwrecks with different dating which were realized through analyzing the pottery artifacts. It is very clear that the Vietnamese Sea lies on the important route of international trade; therefore any and all findings in these seas have demonstrated for the role, position and value of the East Sea of Vietnam on the East - West silk and ceramic route.
Vietnam Maritime Cultural Heritage preserved the remnants of many great naval battles in history and the dynasties of Ngo Quyen, Tran Quoc Tuan with the battle on Bach Dang river was typical samples. In addition to the battles, there are military regimes to protect the sea. The important findings about the seal called "Phương mệnh bình hải tướng quân chỉ ăn" of Le Thanh Tong (1490) found at sea Van Don (Quang Ninh province), can confirm the existence of an army for protection of the Vietnamese seas from that period. All cases such as the Tran Khanh Du’s army carried out the business of coal wholesale; Tran Nhan Tong King moved to Yen Tu mountain for Buddha practice; Tran Hung Dao set up the manor at Van Kiep - Luc Đau river door and the seal called Binh Hai, the oracles of the East Sea of Nguyen Binh Khiem and etc, are the maritime strategies for sea protection from the fathers, suggesting us a direction for more investment on the studies of military heritage and patriotic wars in the East Sea.

Conservation of Maritime Cultural Heritage in Quang Ngai province

Status of Maritime Cultural Heritage in Quang Ngai Province

Quang Ngai province is located in the south central coast region of Vietnam. It borders Quang Nam province in the North and Binh Dinh province in the South and Truong Son High Mountain and majestic Tay Nguyen in the West and the East Sea in the East. Apart from the business of domestic trade, foreign trade activities here through the Hoi An port were also quite developed. In the late 16th century, early 17th century, Minh Huong (village of the Ming people) merchant ships also docked in Co Luy - Thu Xa for trading and exchanging goods and etc. The early 20th century, the Japanese, Chinese and French merchants had their ships docked in
Co Luy - Thu Xa to sell clothing, kerosene, household items, and then buy sugar, cinnamon, salt, dried areca, and honey. Quang Ngai has a long coastline of 129km and wide territorial waters of 11,000km². Quang Ngai has 6 seaports which are favorable for maritime transport and trade. The Ly Son Island of Quang Ngai province is located on the north-south waterway transport of our country, which is also the East-West international trade route in ancient times. Thanks to such an important position, Quang Ngai province was evaluated to be the place having great potentialities for maritime cultural heritage. The discovery and excavation of ancient shipwreck dated the 15th century in 1999 in the place of Song Tau, Vung Tau Sea, Binh Chau commune, Binh Son district, can be said as the starting point for the process of research and discovery of maritime cultural heritages in Quang Ngai province. In addition, that was popular time of hunting antiques underwater carried out by the parts of the habitants living in this area (Fig. 1).

![Local fishermen are diving to find antiques.](Quang Ngai Province Museum, The Center for Southeast Asian Prehistory)

In recent years, Quang Ngai emerged as a hot spot for marine cultural heritage. The first discovery is the Binh Chau 2 ancient shipwreck in 2012. From 4th June to 23th June 2013, Binh Chau ancient shipwreck was excavated, this Binh Chau ancient shipwreck was located about 200
meters far from Binh Chau coast and at the depth of 3.5-4m compared with sea level. We detected the remaining traces of the ship with the length of 20.5 m, the width of 5.6m and the hull of ship divided into 13 compartments with 12 partitions (Fig. 2). Artifacts collected here from include 274 ceramics barrels which are goods on board with ceramic lines such as brown glaze, celadon, blue and white porcelain, blue and white porcelain glaze, dating from the 13th century (Figs. 3-5). In addition, some metals like bronze mirror, bronze weights, boat tacks and bronze money were also discovered on this shipwreck. Archaeological excavation of Binh Chau ancient shipwreck is the 6th ancient ship excavated in the Vietnamese seas. In order to protect this national heritage, excavation experts have wrapped these shipwrecks by steel sheet piles (Larsen), pumping out the water to expose the hull and artifacts aboard, the excavations then were carried out conveniently (Fig. 6).  

Fig. 2(left): Detailed drawings of the part of Binh Chau ship’s rudder. (Quang Ngai Province Museum, The Center for Southeast Asian Prehistory)
Fig. 3(left): Hundreds of artifacts burnt and sticking overlap. (Quang Ngai Province Museum, The Center for Southeast Asian Prehistory) and Fig. 4 (right): Artifacts found in ancient shipwreck in Binh Chau - Binh Son.(Quang Ngai Province Museum, The Center for Southeast Asian Prehistory)

Fig. 5: Celadon-glazed dishes and eel-skin-glazed dishes and apple skin glazed dishies, dating Nguyen Dynasty, the 13th century. (Quang Ngai Province Museum, The Center for Southeast Asian Prehistory)
Fig. 6: The first time of excavation of ancient shipwreck as on land. (Quang Ngai Province Museum, The Center for Southeast Asian Prehistory)

Considering a whole, the maritime cultural heritages of Quang Ngai province are much more than other regions. Until now, they have discovered 10 shipwrecks, in which 08 shipwrecks discovered in the sea areas of Vung Tau - Binh Chau and 02 shipwrecks found in Ly Son Island. Most of the shipwrecks lie about 400m far from the coast, in water depths of between 2m to 5m. It can be seen that the distribution scope of shipwreck traces is quite concentrated, near shore and at quite shallow depth. The discovery of shipwrecks in the seas of Vung Tau province with many different dating, stretching from the 8th-9th centuries to the 18th century, shown that during 10 centuries, this place was an important destination on the route of international trade in ancient times.

In Vietnam, currently, we have not yet found any other area where the relics of shipwrecks distributed densely as the area of Vung Tau, Binh Chau province and also no other province where having rich maritime
cultural heritage as Quang Ngai province. It can be said that the sea area of Vung Tau is an "ancient graveyard" with dozens of shipwrecks have been identified. But these valuable heritage resources are faced with the risk of being destroyed because of the illegal exploitation of a part of local fishermen and the expansion of the project of Dung Quat 2 port. This is really a big challenge for managers and professionals.

Generally, when shipwreck relics discovered, the excavation experts often pay attention to the value of goods transported by ships, but not really fully understood the value of that underwater heritages. Therefore, since the 90s of the last century to now, there have been 6 shipwreck relics excavated officially, and dozens of illegal salvage were conducted only for economic purposes. Hundreds of thousands of artefacts were taken up and carried away for auction at domestic and abroad. By carrying out such exploitation forms, the State may earn some certain amounts for immediate benefits, but they gave up long-term benefits with more value. If we know how to combine with the shipwreck relics with the archaeological sites for creating an over of maritime cultural heritage, we will create favorable conditions for development of tourism here.

Direction of Conservation of Maritime Cultural Heritages in Quang Ngai Province

History has left for Quang Ngai province an extremely valuable heritage resource is maritime cultural heritage. These are assets, enormous resources for studying the values of culture, economy, politic and contemporary society and promoting the value serving for the tourism. To protect the marine heritage of Quang Ngai, we should have a new behavior more positive and proactive with this type of heritage. The question raised here is how to preserve the shipwreck relics and other
forms of marine heritage in order to promote the value for serving the public and contribute to improvement of the people's life in the region through the forms of community tourism and ecotourism.\textsuperscript{12}

Based on analyzing the characteristics of the cultural heritage of Quang Ngai province and comparison with marine cultural heritage in other places, the experts came up with a new approach for the maritime cultural heritage resources of Quang Ngai province. That is the on-site conservation of shipwreck relics serving for exhibition to promote the values of heritage, as well as catering for diving tourism to sightseeing heritage - a favourite tourism type currently being interested by both domestic and foreign tourists. Moreover, the purpose of heritage conservation is to promote the values, particularly here is to build the museum for on-site exhibition and develop forms of diving tourism to sightseeing the heritages. The conservation and promotion of heritage values on the site will obtain the long term and sustainable benefits, creating more jobs and stability for local people. These values will inevitably create positive effects, which make the life of people in the region be improved; people will be more involved in the conservation of heritage. Accordingly, the serious problems such as illegal mining acts and destruction of heritage will be minimized and replaced by an attitude of respect and the actions of conservation and promotion of positive values of the heritages.\textsuperscript{13}

As we know, the cultural heritage is fundamental for economic development, especially for the tourism industry. Marine cultural heritages in the sea areas of Quang Ngai and Vung Tau provinces differ with the others in term of quantity, density distribution, geographical distribution, the depth, etc. With these characteristics, currently, these sea areas are filing the application dossier to the competent authority for obtaining the
approval and recognition as National Maritime Heritage and World Heritage.

**Issues of Replicating the Models for Conservation of Maritime Cultural Heritage in Vietnam**

Conservation of marine cultural heritage is a relatively new field of study in Vietnam at present and is the top concerns of the archaeologists, the museology and researchers. Since the early 90s of the 20th century to the present, the Vietnamese archaeologists have conducted many excavations of shipwrecks from Quang Nam to Kien Giang provinces. Especially, similar to the sea areas of Vung Tau - Binh Chau and Ly Son (Quang Ngai province), Kien Giang province has also become an interesting place with a lot of shipwreck relics. Kien Giang province in general and Phu Quoc Island in particular has become the hot spots for the conservation of marine cultural heritage. Although, the distribution of heritages is not dense as the one in the sea region of Vung Tau - Binh Chau in Quang Ngai province, the sea region of Kien Giang province is potential for various types of heritage. Since 2005, in this sea area, we have discovered 3 shipwreck relics and simultaneously collected the information and artefacts from two other shipwrecks kept by local fishermen.14

Similar to the sea areas of Vung Tau - Binh Chau (Quang Ngai province), the issues of conservation and promotion of values sustainably with respect to the relics of shipwreck in Phu Quoc (Kien Giang province) is very being interested. At the same time, they also carry out the protection of the relics discovered, implementing the investigations and overall surveys of the sea areas of Phu Quoc, Kien Giang province, aim at further discovering the relics hidden, mapping the marine cultural heritage for conservation planning. The next action is to deploy the on-site conservation of marine heritages in Quang Ngai province, drawing
learned lessons and replicating this model for Phu Quoc province. The conservation and promotion of the marine cultural heritage value in Phu Quoc sea, Kien Giang province will contribute not only for serving the political aims of the State in relation to the issues of maritime sovereignty, but also for the purposes of scientist research and especially supporting for Phu Quoc in accomplishment of the national strategic by 2020 is to become the centres for tourism and marine eco-tourism developed at high level; the center for exchange of commercial, high-quality services of the country, the region and the world.

Regarding the Duties for Protection and Promotion of Underwater Cultural Heritage Value in Vietnam

The Government of Vietnam promulgated a Decree on the management and protection of underwater cultural heritage. This Decree provides for the management and protection of underwater cultural heritage, including cultural heritage in the inland water areas, internal waters, territorial waters, exclusive economic zones and continental shelf of the Socialist Republic of Vietnam. I would like to contribute a few thoughts after 10 years this Decree was issued:

The protection and promotion of the values of Vietnam’s underwater cultural heritage must firstly carry out the comprehensive studies and evaluation of the values of heritage. However, the tasks for research, evaluation of underwater heritage is still very limited. The comprehensive, systematic and connective studies are not interested. Accordingly, there still remain a lot of topics and stages which has not been focused and many studying fields have been left vacant. Each organization, each group, each individual researcher, owns privately a block of studying materials and publishes them disjointedly, making our perception incomplete. That is the limit for the work of protection and promotion.
However, the results of research on underwater cultural heritage in Vietnam, based on the foregoing, are only as dotted markings on the panorama. In fact, the studying material son these issues were much richer. If the systematization of studying material can be implemented, it will create many valuable research works. However, those works should go deeply into each topic, each historical period, each region, each field... and then, summarize to help managers get the suitable policies and strategies in terms of not only the protection and promotion of heritage value, but also the political, economic, cultural, and social aspects.

Regarding documents, artefacts, collections and exhibits of underwater cultural heritage in Vietnam, though many stages and studying fields thereof are still vacant, but based on the obtained results from the studies and the collections from the researchers and museums, it should be better to have a museum of the underwater cultural heritage. Quang Ngai province has a museum project in Ly Son on Truong Sa - Hoang Sa and a museum project on vessels and maritime cultural heritage in Phu Quoc Island. The above activities have just only exploited in the extreme small extent of this field in comparison with the large scope of underwater cultural heritage in Vietnam. Therefore, it is necessary to build a more comprehensive and broader museum with the investment from the State to promote underwater cultural heritage in Vietnam. Accordingly, we will have the orientation and a more in-depth vision in the work of study and exhibition on this field.

Regarding festival of coastal areas and islands of Vietnam, since there are many similarities in term of the content, rituals and feature between them, we suggest expanding the influence of some festivals with the significance as the festival of ethnic communities, but not just the festival
at the level of village community, regional or local communities. For last several years, Ly Son has elevated to the festivals but still not satisfying as expected. To achieve this, the work for research, evaluation, rehabilitation and supplementation should be made. Accordingly, we would promote the influence in terms of politic, society, economy and culture of the festivals with the local and international communities. The protection, restoration and embellishment of the cultural heritages in general and the underwater cultural heritage in particular have been reached many remarkable achievements during recent ten years. However, with a huge volume of such heritages, it is impossible for the state budget to cover all expenses for implementing such jobs. Although, the socialization of this job in many provinces is very significant for many years, however it should be applied and replicated in this case. However, the protection of cultural heritages is still much neglected and loose. These relics in Cai Beo (Cat Ba - Hai Phong city), how much area is left while the urbanization rate is going strongly today? The archaeological sites in Truong Sa discovered by the colleagues from Vietnam Archaeology Institute in the 90s of last century, but recently, were concreted. Apart from Truong Sa, in Phu Quoc, with the rate of rapid growth at present, many construction works were springing up, but archeology has not reached out to them. Heritage sector should actively propose in advance the major construction projects in Phu Quoc, Co To... serving for the investigation, research and excavation.

**Conclusion**

Since this article presents about cultural properties in the coastal and sea and island areas of Vietnam only from the perspective of Quang Ngai province, there are many other findings, important researches and many valuable scientific insights have not been mentioned here; therefore, the
author expected that this article will get the reader’s sympathy. Apart from Quang Ngai province, there are currently many other hot spots of marine cultural heritage in Vietnam. Therefore, there must be a consistent and long-term strategic and plan for the issues of conservation and protection of this important heritage for the country and the future generations.

To conclude, there are two main issues we want to affirm:

1. The sea and islands cultural heritage of Vietnam is extremely rich with the various types, characteristics, and different historical periods. However, the studies in this regard have not been carried out regularly, continuously and systematically. The reason for this situation is that there is no State authorities to be assigned for taking in charge this issue to manage with the long-term orientation and for each specific stage.

2. With the abundance of sea and island heritages, the conservation and promotion of their values should have a strategy, with the longer and wider vision. However, for each particular case, it should have the situational reaction to timely protect and preserve the precious heritages for serving the long-term strategy.

With that spirit, it is necessary for Vietnam to have a research agency specializing in the underwater cultural heritage, existing besides a separate museum or sectoral museum under this research agency to perform research centralised, professional projects. This research agency also needs a center of underwater archaeology, instead of an underwater archaeology division under the Vietnam Institute of Archaeology as present, which was invested by the limited and slow human resource and facilities. This is the model that the Koreans applied and they also have cooperated with Vietnam during last years for implementing many
research programs effectively. In order to make the premise for this model, all materials, documents, artefacts... should be centrally gathered with an authority having the same objectives and functions for research on maritime heritages, announcing the depth issues in each study areas, each historical period, then to review and evaluate for providing the next studying direction.

Minister of Culture, Sports and Tourism of Vietnam or Vietnam Academy of Social Sciences, under the National University of... are the appropriate authorities to perform this task. As the preparatory step, the specific research programs on maritime cultural heritage should also be planned, with the detailed assignment for each competent authority with the objectives and functions for research in each field, implementing each program or project. One of three ministries and ministerial-level agencies should gather the above experts, formulating programs, plans, schemes and projects prior to the assignment. This is a great and long-term program which needs the investment/funds from the government budget.

Endnotes


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Oil Spill Analysis on Ambon Bay, Moluccas, Indonesia: Its Influence on the SS Aquila Shipwreck Site

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Abstract  
The Steam Ship (SS) Duke of Sparta or SS Aquila shipwreck site is one of the underwater cultural heritages (UCH) discovered in Ambon Bay, Moluccas waters, Indonesia. Currently, this 1940-s British-Italian shipwreck is threatened by an oil spill contamination on Ambon Bay. In Ambon Bay, there is Wayaime Port, which is a transit port for ships, and the port for oil tankers to loading and unloading their oil cargoes. One of the biggest oil spill incidents in Ambon Bay occurred in August 2005, when a fishing boat of MV Fu Yuan Fu F66 was exploded. This on-going oil spill occurrence can affect SS Aquila site sustainability due to corrosion issue, disrupt marine tourism activities, and harm marine biota in the surrounding area. One purpose of the study conducted by Research Institute for Coastal Resources and Vulnerability in 2016 is to determine the oil spill distribution inside the Ambon Bay which is threatening the SS Aquila shipwreck site. The method employed in this
research is a hydrodynamic modelling approach of oil spill module. The result of oil spill modeling is then analysed spatially. The study results show the period of diesel oil distribution is reached ± 285 hours, with the spread direction is toward to Southwest (outer of the bay). The processes found in this oil spills event includes a process of dissolution, evaporation, and vertical dispersion. Based on the study, it can be concluded that the intake of the oil spill on Ambon Bay waters is undoubtedly threatening the preservation of the SS Aquila underwater cultural heritage along with its marine environment, and the development of marine heritage utilization.

**Keywords:** SS Aquila, hydrodynamic modelling, oil spill analysis, underwater cultural heritage preservation

**Introduction**

The waters of Indonesian Archipelago, both in east and west parts, are significant on the regional-interregional maritime trade routes, and is well-known as the center of the spice trade. The eastern part of Indonesian Archipelago became a vital area of global sea navigation due to abundant spices resources such as cloves, nutmegs, and cinnamon. While, the western part was important in the spice trade routes due to its position as the center of pepper trade (Harkantiningsih, 2013). That condition is caused by the strategic geographical location and the existence of the transportation network which facilitated the distribution of these primary trade commodities since an ancient time (Fig. 1). One of the essential spice trading spots in Indonesia is the Moluccas, which is also popular as Spice Islands.
The center city of Moluccas is Ambon city. This city has a long history of World War II (WWII) incident which involved the Japanese imperial troops and Allied Forces including Dutch *Het Koninklijke Nederlands(ch)-Indische Leger* (KNIL) and Australia. After WWII was over in 1945, Ambon city along with other cities in eastern part of Indonesia faced a rebel movement incident committed by *Perdjuangan Rakjat Semesta* (PERMESTA) or *The Universal People Struggle* Army in 1957-1958. This rebellion to attack the Indonesian central government, and implicitly, to re-established the Dutch colonialism in Indonesia, was supported by Allied Forces, particularly Dutch and United States of America (USA). In this PERMESTA rebellion time, the trade ship of SS *Aquila* was bombed by a *Douglas B26 Invader* plane in 1958 in the northern of Ambon Bay. This bombing of SS *Aquila* was planned by the Central Intelligence Agency (CIA) of USA to clutter up the economic sector from trading activities in Indonesia (Amal, 2006).
Today, the location of SS *Aquila* is well-known as a dive site among the locals and international divers. It becomes one of the underwater cultural heritage sites discovered in Ambon Bay\(^1\). This shipwreck is located on a slope on the seabed off Ambon, with its stern about 15 meters (8 fathoms) below the surface and its bow about 35 meters (19 fathoms) depth\(^2\). Besides *Aquila*, there are some other shipwreck sites which have not been identified yet found in this bay. Recently, the existence of SS *Aquila* shipwreck is threatened by disposal waste, sedimentation, marine litters, and oil spill contamination which directly stream to SS *Aquila* and other UCH sites in the inner of Ambon Bay. A Wayaiame Port in Ambon Bay is a transit port for many types of ships, and also the port for oil tankers to loading and unloading their oil cargoes. Therefore, oil spill incident becomes quite common in this bay. In August 2005, a fishing boat of MV *Fu Yuan Fu F66* was exploded\(^3\) and became one of the biggest oil spill incidents in Ambon Bay. This on-going oil spill occurrence may affect SS *Aquila* site sustainability due to corrosion issue, disrupt marine tourism activities, and harm marine biota in the surrounding area. In addition, the lack of heritage knowledge and awareness of the local community, local authorities, oil and shipping companies, and general public regarding the importance of UCH preservation in Ambon Bay require immediate attention.

Those conditions can endanger the wreck site and inhibit the site preservation, the development of maritime conservation area, and can decrease shipwreck diving tourism activities. Due to that reason, the research which deeply concerns in the oil spill impact to the shipwreck site is necessary to be conducted. Besides identifying the shipwreck site in Ambon Bay and researching its current physical condition, the underwater archaeological study carried out by the research team of Research Institute for Coastal Resources and Vulnerability in 2016 was also aimed
to determine the oil spill distribution inside the Ambon Bay which is threatening SS Aquila shipwreck.

The History of SS Aquila (SS Duke of Sparta)
SS Aquila was a cargo ship which initially named as SS Duke of Sparta. This Duke of Sparta was launched in 1940 from William Gray Shipyard, West Hartlepool, and later on, sold to a Napoli Italian company in 1951. Its name was changed and became SS Aquila. In Indonesian history, SS Aquila has been targeted to be destroyed by USA to support PERMESTA rebel movement interest in disrupting an economic sector of Indonesia. Besides SS Aquila, there are two other cargo ships in Ambon Bay, which were a Yunani ship, SS Armania, and Panama ship, SS Flying Lark. Those ships had been raided by Allen Lawrence Pope, a USA paramilitary aviator who flew CIA bombing missions in the PERMESTA rebellion. He joined USA Air Force officer, William H. Beale Jr, to operate a bomber aircraft Douglas B-26 Invader for PERMESTA rebels. In 27th April 1958, Allen Pope did his first mission at the same time of William Beale’s 3rd bomb mission. The air raid of SS Aquila by Allen Pope was not resulting in any fatalities, and that ship was sunk one month after bombing incident on 27th May 1958.

The Potential of Maritime Archaeological Resources of SS Aquila
The top position of SS Aquila shipwreck was found in the depth of 15-35 meters with the bow position facing to southwest. The shipwreck body was still intact and several parts has collapsed, such as the crane, chimney, and the crane wall. Some parts of the shipwreck were damaged due to human pillaging. The ship engines, which were still intact and covered by cables and stairs, were found in the depth of ± 40 meters. While, the profiler cannot be seen anymore. Coral covered the shipboard name.
According to the information obtained from local people, there were massive lootings of SS Aquila shipwreck committed by irresponsible people using makeshift tools. It is assumed that the looters salvaged the ship profiler which has high economic value. The dimension of SS Aquila can be seen in Table 1. At the time of diving SS Aquila, the team still could penetrate some parts of the shipwreck to take a video and photo documentation. Figure 2 shows the underwater documentation of SS Aquila, and the location of Aquila shipwreck site is shown in Fig. 3.

**Table 1. The Specification of SS Aquila**  
*(Source: Tony, 2013)*

<table>
<thead>
<tr>
<th>Name</th>
<th>SS. Aquila (1951-1958)</th>
<th>SS. Duke of Sparta (1940-1951)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Cargo ship</td>
<td></td>
</tr>
<tr>
<td>The sunken date</td>
<td>27th May 1958 in Wayame, Ambon Bay</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>5397 Ton</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>441.1 ft. (134.4 m)</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>57.8 ft. (17.6 m)</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>25.4 ft. (7.7 m)</td>
<td></td>
</tr>
<tr>
<td>Propulsion</td>
<td>3-cylinder triple-expansion steam engine</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>492 NHP</td>
<td></td>
</tr>
</tbody>
</table>
There were a lot of biota living in the shipwreck site including 42 types of reefs which are covering the ship's body. Additionally, some types of fish can also be seen around the site. Local communities and foreigners
have known the presence of Aquila shipwreck. However, even though today it has been utilized for diving tourism, this *Aquila* site has not been managed properly by government, both local and central.

The underwater cultural heritage potential in Indonesia is tremendously huge (Ridwan, 2011) in the form of shipwreck sites. This includes some shipwreck sites discovered across the Moluccas waters which related to the significance of sea trading activities in the maritime history of Moluccas waters. According to Amal (2006), the trading strategy implemented was expropriated the spice production area to facilitate monitoring. While, they also developed the collecting area of spices, such as Ambon waters, where the spices later on will be sent to Europe. Therefore, it is clear that the Moluccas is one of the most important regions of spice sea trading at that time with large number of sailing ships from many countries and regions. This situation added by many incidents from WWII until the PERMESTA rebellion caused the richness of UCH found in this area.

**The Oil Spill Problem in the Inner of Ambon Bay**

The presence of oil spill in the inner of Ambon Bay was severe alarming. The ships daily activities in Waiyame Port in Ambon Bay affect and increase the oil concentration in this sea waters area. This condition which is also supported by the weak water mass dynamics can result in the deposition of the oil spilled. According to Huang (1983), nine processes (including the physical, chemical, and biological processes) can cause the providence and behavior of spilled oil such as advection, spreading, evaporation, dissolution, emulsification, dispersion, auto-oxidation, biodegradation, and sinking/sedimentation. The spilled oil does not only inhibit the environmental condition but also affects negatively the biota. Moreover, all of part of sea water in the area will be polluted, and
consequently will also affect SS Aquila site sustainability and cause a corrosion issue on the shipwreck.

The explosion incident of MV Fu Yuan Fu 66 resulted in the water pollution in Ambon Bay (Research Center of Biotechnology, 2009), which widespreaded along the coastline around the exploded ship. The source of explosion was an engine room and caused the ship’s engine leaking, therefore, the oil spilled into the sea water (Helut, 2015). The prevention action was done by the local people using an oil boom net. However, the effort did not really work in reducing the impact of this oil spilled incident.

**Oil Spill Simulation Result**

The oil spill simulation was supported by a hydrodynamic flow model implementation which simulated to determine the oil spill distribution. The simulation applied for 15 days to represent the oil distribution period until the oil degraded and deposited in the bottom of the water. Flow model was employed to build a hydrodynamics simulation which is shown in the form of two-dimensional form (Warren and Bach, 1992; Mehdiabadi et al., 2015). The input of the model is using winds, bathymetry, and coastline data digitized using Google Earth image 2016. The surface elevation is obtained from NAOtide tide forecasting in the form of time series data.

Acoustic Doppler Current Profiler (ADCP) was deployed in shipwreck site area for 2x24 hours. ADCP records several physical data such as tide, temperature, and current data. The tides data are used for the verification of the results of the hydrodynamic modeling which employed Root Mean Square Error (RMSE) formula.

The simulation applied only used one scenario which employed the diesel oil with the oil viscosity of 6.9 %v/v. The distribution velocity of oil that spilled in the surface is based on the viscosity of that oil. Oil with low
viscosity will be easier to flow and vice versa (Mukhtasor, 2007). The source of diesel oil spill was implemented as well as the sunken point of MV *Fu Yuan* and Wayame Port. The model simulated the oil contamination from the source which is modeled based on the release of the particles.

The model result must be validated. The model validated by comparing the model data and field measurement data obtained. The graph of model validation is shown in Figure 4, which shows that the fluctuation of surface elevation has the same phase between two data. The RMSE value obtained of 4.57 %. The current speed obtained by retrieving the ADCP measurement result, which ranged from 0.1-0.3 m/s. According to Wang *et al.* (2008), the amount of oil released at sea is distributed among a large number of particles which are tracked separately. These particles are driven by a combination of induced currents, waves, and wind velocities.

![Fig. 4: Model validation using Surface Elevation.](image)

Exposure time is the time needed by the oil spilled to move from one grid to another grid (DHI, 2007). Based on the 15 days simulation resulted the distribution pattern of spilled oil, it shows that the diesel oil has the exposure time of ± 285 hours. According to Simonato *et al.* (2010), the diesel oil is easier to be exposed due to the unsupported of residual fraction. Fig. 5 shows the spilled diesel oil which well distributed around
the border of inner and outer Ambon Bay. The oil flows gradually following the current direction. For 15 days simulation, the oil exposed to the area of UCH preservation in Ambon Bay. The processes found in this oil spills event includes a process of dissolution, evaporation, and vertical dispersion. McCaY and Paine (2001) stated that the dissolution rate of hydrocarbons in water is useful in predicting both weathering pathways and possible biological harm. The oil evaporation effects on the formation of emulsification which the different types of emulsification are formed under different condition (Xie et al., 2007). Li et al. (2008) pointed out that the effectiveness of dispersion can be found in the water column oil concentration and size distribution of dispersed oil droplets. It dispersed and diluted under the regular wave and breaking wave condition.
Fig. 5: Simulation for exposure time to diesel oil for 15 days.

The thickness of the diesel oil surface layer ranged from 105-185mm. It shows that the surface layer of diesel oil is 60% wider in the surface water, and the diesel oil is more readily exposed by hydrodynamic factors. The influence of spilled oil is threatening the existence of SS Aquila including the biota around it. This on-going vertically dispersed oil might be evoking the corrosion issue of the shipwreck impacted.

The impression of SS Aquila is dominated by the remains of the boiler, engine, and frames which are formed from steel and iron. In the tropical seawater which is warm, the corrosion of steel and iron are faster due to the support of encrusting organism’s encapsulation such as bryozoan, corals and coralline algae (MacLeod, 2002). The occurrence of oil spilled aggravated the corrosion issue. The oxidation processes occurred beneath the marine growth and oil compound separation is the major
factor in the seabed corrosion. Supporting by the high rate of sedimentation will destroying the UCH of SS *Aquila*.

**Conclusion**

Based on the study of oil spill incident in the area of SS *Aquila* shipwreck site in Ambon Bay, it can be concluded that the distribution of diesel oil dominantly caused by hydrodynamic factors which evoke the process of dissolution, evaporation, and vertical dispersion. The water column dispersed oil triggers corrosion of the iron material such as a sunken ship in Ambon Bay. The intake of the oil spill on Ambon Bay is undoubtedly threatening the preservation of the SS *Aquila* underwater cultural heritage along with its marine environment, and disrupting the development of marine heritage utilization.

This study can be useful as a basis for the preservation of SS *Aquila* and other UCH sites in Moluccas waters. This research can also raise awareness of the local government to give more attention to oil spill incident, sea water pollution, and plundering activities of shipwreck sites committed by local communities in Ambon Bay. The rich history and potential of UCH sites in Ambon Bay can be utilized for the sustainable tourism development that gives opportunities to prosper the society in the vicinity.

A lot of method to resolve oil spill problems has been developed by researchers around the world such as by using oil booms, organic solvents, and superhydrophobic and superoloephilic sponges. It is recommended that the local government in particular the environmental agency to periodically control the condition of the waters and the symptoms of oil spills in Ambon Bay. Preventive action to safe the marine environment is urgently necessary to overcome the corrosion effects
which occur in SS *Aquila*. The corrosion and site destruction on shipwreck site are unavoidable. However, it can be reduced through monitoring effort of ships movement on shipwreck site, decrease oil spill incidents and other pollutants, and use cathodic protection method.

**Endnotes**

1 Information related to SS Aquila shipwreck diving can be found in some blogs of local divers. [http://www.divingmaluku.com/2017/03/ambon-wreck-diving-ss-aquila-duke-sparta/](http://www.divingmaluku.com/2017/03/ambon-wreck-diving-ss-aquila-duke-sparta/). The integrated scientific research regarding SS Aquila shipwreck has never been done before the research conducted by Research Institute of Coastal Resources and Vulnerability in 2016.

2 The specification of SS Aquila can be found in the Lloyd’s Register, Streamers & Motorships. London: Lloyd’s Register 1941.

3 This information was retrieved from [http://www.m.liputan6.com](http://www.m.liputan6.com). (Tumpahan minyak di perairan Ambon meluas/11 July 2017)

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**References**


**Biography**

**Ulung Jantama Wisha** is Oceanography Research Scientist who has been working in the Ministry of Marine Affairs and Fisheries since 2015. He was graduated from Oceanography Department of Diponegoro University in 2014. Until present, he has contributed in several research projects on underwater cultural heritage (UCH) sites in Indonesia which conducted by Research Institute of Coastal Resources and Vulnerability. In 2015, he attended an underwater archaeology summer school organized by Institute of Archaeology-ICOMOS-ICUCH-SEAMEO SPAFA-UNESCO in Vietnam. His research interest is an applied oceanography area, including maritime archaeology, ocean modeling, environmental aspects, as well as ocean climate issues. He has published 17 writings until today.

**Guntur Adhi Rahmawan** is Geomatics Research Scientist working in Indonesian Ministry of Marine Affairs and Fisheries since 2015. He was graduated from Department of Geomatics Engineering, Diponegoro University. His research interest is a coastal resources and vulnerability, particularly in Hydrography area. Last year, he and his team have conducted research maritime archaeological resources for conservation.
area in Ambon Bay which eventually provided the basis data of this paper. He also frequently contributed to other archaeological researches in RICRV and assisted in the making of shipwreck sketches in complementary analyzes of coastal resources.

**Nia Naelul Hasanah Ridwan** is Maritime Archaeology Researcher working in Ministry of Marine Affairs since 2005. She hold a Master of Social Science in Environment and Heritage from James Cook University. Until present, she has led some research projects on underwater cultural heritage (UCH) sites throughout Indonesian Water. For her dedication, The President of Indonesia awarded *Satya Lancana Wira Karya* Award in 2015. Nia's interests include the relationship between UCH and its environment; threats to UCH; UCH long term protection; maritime museum affairs, community engagement; marine-heritage tourism; and illicit trafficking. Nia had attended some trainings held by UNESCO, ICCROM-SEAMEO SPAFA-The Getty Foundation, and The Netherlands Cultural Heritage Agency. She has published 51 her research results.

**Gunardi Kusumah** has been working in the Ministry of Marine Affairs and Fisheries. In 2010, he was assigned as a Head of Research Institute for Coastal Resources and Vulnerability (RICRV) until present. His research interest is an Environmental Geology area. In recent years, he has focused his research on hydrogeology and groundwater resources, especially their characteristics and potency, as well as the interaction with coastal environment. He was also involved in all maritime archaeological researches conducted by RICRV from 2012-2017, and dedicates his expertise on sedimentation process and marine geological aspects to examine the vulnerability of shipwreck sites.
Session 10: Underwater and maritime archaeology in South Asia (The Indian Ocean Region)

The underwater cultural heritage (UCH) of the Indian Ocean ranges from the Prehistoric period to the last century. Most of the Indian Ocean Rim countries have taken keen interest in preserving UCH by undertaking explorations of shipwrecks, submerged ports, habitation, landscape, aircraft, etc., lying on the seabed and in inshore regions, besides promoting awareness programmes, research and capacity building activities on their own and with other countries through inter-disciplinary cooperation. Some countries of this region have ratified the UNESCO Convention for the Protection of the Underwater Cultural Heritage. Moreover, the UNESCO had organized the Foundation Training Course on Underwater Cultural Heritage in the Asia-Pacific region to train the professionals of this region. Now professionals of individual countries are extending cooperation to the universities and research institutes to promote awareness on the UCH as well as Underwater Archaeology.

With this background, the proposed session - Underwater and maritime archaeology in South Asia (The Indian Ocean Region) – intends to build cooperation among the Indian Ocean countries on research, protection and preservation of UCH, documentation of evidence of indigenous communities, and capacity building activities in underwater and maritime archaeology of this region. In this session it is proposed to invite presentations on the research carried out on (i) underwater and maritime archaeology of this region, (ii) problems, challenges and opportunities faced by the Indian Ocean Region on UCH, (iii) collaboration on research and capacity building in this field.

Session Chair: Mr. Sila Tripati

*Session Papers will be submitted to the MUA in a separate Addendum in 2018*
Session 11: Amphibian Warfare in the Asia-Pacific region

With the development and improvement of water transport, rivers, lakes, and oceans have been increasingly colonised by humans and exploited for economic purposes. Many studies have been conducted on the establishment, use, and modification of transport routes, focusing mostly on the economic aspect that is usually associated with these networks. However, competition for resources leads to friction, and friction generates conflict. Amphibious (or ‘combined’ or ‘joint’) operations in Asia-Pacific have been documented in various periods of time. From the Chola attack on Srivijaya in the 11th century AD to the fluvial battles depicted in the bas-reliefs of Angkor, it seems clear that the ability to undertake such operations was an important quality for embryonic military establishments; and attempts to carry them out shaped the pattern of many conflicts.

Focused particularly on the impact of the geography and the environment of the region, this panel aims to examine the organisation, conduct, and purpose of amphibious warfare in Asia-Pacific. That is, it examines a form of warfare which usually takes place on coasts, whether of continents or islands, but which sometimes takes place on inland waterways—a form of warfare in which land-based and waterborne forces cooperate, whether against a similar conjunction of forces, or against a solely land- or water-based enemy.

We would like to invite papers that look particularly at the effect of climate, environment, and geography on the establishment of power landscapes or battlefields. Other themes we would also like to explore are changes in nautical technology and the militarization of vessels.

Session Chairs: Prof. Em. Dr. Mark Fissel
Dr. Brian Fahy

*Session to be published in its own Anthology in 2018*
Session 12: The study of traditional boat technology: complementary approaches to maritime archaeology (maritime ethnography, archival research, iconography studies, museum collections etc.)

In addition to archaeology, and maritime archaeology in particular, a wide range of source material is available to those studying ancient boat technology. Maritime ethnographic surveys, ethno-historic boat studies, historical enquiries, archival repositories, iconographies, and boat models in museum collections are examples of complementary sources that the maritime archaeologist can consult. This session proposes to gather various research projects that explore ancient boat technology, based on archaeology as well as other source materials. This session’s objective is thus to include multidisciplinary approaches to research that draw from a variety of sources. On one hand, this session will offer a panorama of different boatbuilding traditions from the Asia-Pacific region; on the other hand it will highlight the high potential of other source material.

Secondly, this session aims to offer a platform of discussion to explore the meaning of “traditional boatbuilding”. It will show the great variety of “traditional boatbuilding” in the Asia-Pacific region and thus the need to define “tradition” with more precision. “Traditional boatbuilding” is disappearing rapidly, along with precious local knowledge on maritime aspects of culture. There is an urgent need to record and document these traditions and knowledge, and to develop means by which to use the data effectively for learning about the Asia-Pacific's maritime past.

In sum, this session will contribute to the discussion of boatbuilding traditions in the Asia-Pacific region by exploring evidence derived from archaeological evidence while discussing the quality and value of other source materials in adding to the understanding of these traditions. Approaching boatbuilding from such a broad perspective will undoubtedly contribute to revealing aspects of the maritime cultural landscapes and seascapes of the Asia-Pacific.

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Almost a new logboat older than 8,000 years?

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Abstract

Sometimes the ambition of researchers remains empty-handed although all the circumstances suggest that a positive outcome would have happened. This kind of situation took place just a few kilometres away from the 7,500-year-old Hotiza logboat in the Mura River. The first information from the road and riverbank reconstruction was that a carved log 7m below the surface was being explored. However, during the excavation process, the situation got much more complicated when the first preliminary radiocarbon dating showed us that this log with a trace of carving was about 8000 years old. It was exciting when the around 3m long logboat-like trunk was re-examined from the beginning of the excavation. However, at the end of the excavation, the root system of that same trunk was discovered. After a consortium of wood specialist, dendrochronologists, forest researchers and archaeologist examined it, they decided that environmental circumstances had naturally formed a tree trunk into a logboat-like outline. However, this information was not provided to the academics due to an 8000-year-old tree trunk, but we would like to discuss this artefact in the frame of special natural environmental processing that often gave humankind an easy way to craft and made vessels for travelling. Moreover, our ambition is also to refresh the knowledge of the excavated logboat older than 6000 years. We can find out that all around the world, a similar demand for vessels has been discovered in the specific
environments where the genotype of the forest was suitable for use in logboats.

**Key words**: Slovenia, Hotiza, Stone Age, logboat, Mura River

**Introduction**

During the reconstruction of the northern verge of the Trate - Gornja Radgona regional road in Pomurje, a northeast area of Slovenia, construction operators discovered two parallel trunks, at least 4m long, at a depth of 7m below the road surface (Fig. 1). The regional unit of the Institute for the Protection of Cultural Heritage of Slovenia was informed about the find. In April 2016, an archaeological inspection and preliminary documentation of the findings was conducted. The preliminary result revealed that at the bottom of the excavation was a fossil white maple (*Acer pseudoplatanus*) tree trunk lying parallel to another trunk. Later this year, a protective archaeological excavation followed.
Fig. 1: Location of the excavation in Trate Village and the Hotiza logboat in the northeastern part of Slovenia near the Mura River. (Gal-Peters Projection of World; Plan of Slovenia credit by www.freeworldmaps.net).

Discovering an 8,100-year-old maple tree trunk

**Excavation:** In total, 60m$^2$ were excavated and documented. The average depth of the excavation was 5.5m, and approximately 300m$^3$ of sediments were removed. 30m$^3$ of geological layers were removed manually. Only three of the documented 28 stratigraphic units contained human remains in the treated area. All three stratigraphic units were contemporary and are directly related to the modern reconstruction of the road and embankment. The excavated remains can be described as the result of geological processes that were occurring at the boundary between a landslide on the bank of the Mura River and the proluvial sediments of the nearby riverbed. Therefore, the excavated trunks were buried in river sediments. Because of their striking parallel arrangement,
we were almost sure before excavation that we had found the remains of a Mesolithic wooden structure (Lazar and Rižnar 2016).

Based on the data obtained during the early part of the archaeological excavation from the beginning part of the site, it was interpreted as a human walking surface and a possible manoeuvring area near the river. However, the stratigraphic layer was horizontal and located only a few centimetres above the trunk that was supposed to have been arranged parallel with the riverbed of the Mura River. Stone layers and trunks were interpreted as the remains of the archaeological structure, whose exact purpose could not be determined. Because of the small operating area, a surviving part of a towpath or road along the Mura River was assumed. This interpretation was very questionable after receiving the radiocarbon dating of wood. However, it could be proved correct if the protective archaeological investigations discovered possibly used fossil wood from the Mura River. Meanwhile, the fact is that several similar fossil trunks have been discovered in the Mura River and its backwaters in the Pomurje region (Fig. 2).

*Fig. 2: The ‘logboat’ during the excavation. (Credit by Centre for Preventive Archaeology of Institute for the Protection of Cultural Heritage of Slovenia; Photo by Evgen Lazar).*
This preliminary information and prediction were the basis and starting point for further archaeological research and excavations. During the archaeological excavations, numerous stratigraphic units were discovered and documented, all of which are of geological origin and were formed by the geological progress of the hillside and by flow activity from the east/south riverside and the Mura River. Following the extension at the beginning of the excavations, it was immediately noticed that the discovered trunk was partially hollowed out and the inside filled with sediment. Therefore the earlier interpretation as hardened towpaths along the Mura River was no longer believable.

Before continuing the excavation, some layers were interpreted as the remains of the Mesolithic logboat, which was washed up there by the Mura River or was possibly even originally carved at the place. Therefore, due to assuming possible traces of carving inside the tree trunk, which would indicate the human manufacturing of a logboat, the whole of the excavated sediment was examined a water sieved. Unfortunately, traces of processing wood have been detected the layers. After the meeting of the expert committee, geologists, biologists, foresters, conservators and archaeologists, it was estimated that the stones transported by Mura River could explain the traces on the wood. However, until we lifted and transported the trunk, we could not examine the outer side, but the question of uncontrolled wood drying meant that it was deliberately left in situ.

**Dating and wood species:** During the first exam of the site, the timbers were sampled for radiocarbon dating and identification of the species of
the wood. A sample was sent to the Beta Analytic Radiocarbon Dating Laboratory, where they performed radiocarbon dating. From the beginning of the site inspection, nobody was expecting spectacular data, so the results were very astonishing. However, the measurements (Beta-437481) of the conventional radiocarbon age of the wood was 8100±30 BP with C13/C12 variables of -24.7 ‰. By using the Intcal 13 calibrating application, the calibrated results within a 68% probability was 7127-7111 calBC and with a 95% probability 7189-7026 calBC. This result was highly significant from an archaeological point of view since no more than 30 miles downstream along the Mura River near Hotiza, a 7600y old oak logboat was discovered in 1989 – one of the oldest in the world. Meanwhile, at the Department of Geobotany of the Faculty of Natural Sciences and Mathematics, University of Maribor, the dendrological examination was conducted by Mitja Kaligarič and Igor Paušič. The trunk was recognised as maple (*Acer pseudoplatanus*) with around 68 tree rings.

**The natural environment:** The archaeological sites are located around 80m downstream from the bridge over the Mura River at Trate, the northeast region of Prekmurje in Slovenia. The location below the steep northern hillside of Vranji Vrh Hill is located in a few meters deep construction hollow below the road that runs along the right bank of the Mura River. Geologically, the steep slope above the road is a sedimentary rock of the Šentilj member as part of the Špilje formations, which consists of alternating clayey and silty marlstone and sandstone. On the described rock also forms the Hrastovec-Kresnica member of the Špilje formations, represented by the so-called lithothamnian limestone from the Badenian Middle Miocene age. In the broad area of the site, only two minor erosions of this a residual limestone are present on each side of the narrow gorge,
which flows into the Mura River. In the hinterland between Trate and Lokavec, rocks were described as covered by the Selnica member of the Špilje formations, which is formed by the interchange of sand, sandstone, marlstone, siltstones, clays and conglomerates, as well as local sandstone and algal and oolitic limestone (Jelen and Rifelj 2011; Žnidaršič and Mioč 1989).

Analysis of sediments in the stratigraphic layers at the site showed that poorly rounded and angular boulders of white Lithothamnium limestone do not belong in the common sedimentation structure of the Mura River. However, such rock outcrops are present along the Mura River basin to a small extent a few kilometres upstream. Since this pebble is a relatively soft limestone, it should be rounded and not angular if it originated from the Mura River basin. There was an unusually large share of these pebbles, representing up to 20% of all sediments. That is inconsistent with the small area of Neogene limestone on the surface of the Mura River basin. That is even truer for the marlstone pebbles since they would have decomposed after just a few hundred meters in the Mura River. However, if we can find very well abraded non-carbonate pebbles, poorly abraded soft Lithothamnium limestone pebbles and finally un-abraded neogen marlstone pebbles together in the same layer, it indicates the fact that it is proluvial sediment. It could be agreed that the site is part of the torrential stream cut into the deep gorge that flows out into the Mura River just a few meters downstream of the excavation. The bedrocks eroded by the torrential stream on its course contain all the components that make up the sediment that also contains the excavated trunks. However, the same also applies to the sediments that cover the described layer. The described layers, therefore, represent proluvial sediments from a nearby
torrent stream that Mura River has failed to erode (Lazar and Rižnar 2016).

**Documentation:** 3D point clouds and meshes were produced using Micmac (Rupnik et al. 2017), a semiautomated open-source multi-image photogrammetry software solution.

541 original images taken using a Nikon D7000 with a resolution of 4928 x 3264 were resized to 50 percent of their original size. The images were manually reviewed and divided into six sets of images with similar characteristics (distance to the object, illumination, coverage). Each set consisted of ten to eighty images and was processed separately using MicMac. Five of the six sets successfully produced dense point clouds and meshes with textures. The set with forty images produced the most accurate and well-covered dense point cloud of 1,808,200 points. Multi-image photogrammetry was done in eight stages: 1. automatic point matching using MicMac Tapioca MulScale; 2. computing the relative orientation using MicMac Tapas FraserBasic; 3. generating camera position visualization on the sparse point cloud using MicMac AperiCloud; 4. generating the dense point cloud using MicMac C3DC BigMac; 5. manually removing noise using CloudCompare software; 6. generating the mesh using MicMac TiPunch (Poisson reconstruction); 7. removing meshing noise using Meshlab software, and 8. generating textures using MicMac Tequila (Fig. 3).
Results: During the excavation, it was revealed that the trunk is without inner part of the wood and the ‘U’ shape concavity allows us to gather that we might have discovered a logboat. During the excavation of the inner surface, small facets were spotted that were supposed to be traces of tools. However, during the cleaning of the end part of the "logboat", it was noticed that the trunk spread into the root system, which was the first sign that our preliminary interpretation might be wrong. When lifting the "logboat”, several parts of bark on the outer surface of the trunk were observed. However, this obviously indicated that we were dealing with a fossil maple tree trunk, which was hollowed out by natural phenomena rather than human activity. Despite the fact that there was no trace of human activity in the trunk, the expert committee decided to preserve the excavated trunk in a safe watery environment, which enables the preservation of wood and further research.
The logboat from Hotiza

The paleochannels of the river Mura in Slovenia are used for digging gravel deposits. In one of them near Hotiza in Lendava, at a depth of about 6 to 7 meters, local workers in 1989 discovered a logboat over nine meters long. Colleagues from the Institute for the Protection of the Natural and Cultural Heritage of Maribor documented the discovered finds in the next few days (Tušek 1990).

The logboat was significantly damaged as it was several times grasped at the sides and part of the stern was broken by gravel basket lifting. The preserved length was 9.34m, a width of 1.10m and height 0.70m. The average thickness of the bottom was 17 to 22cm, and the sides are gradually thinner from the bottom to the top, with an average width ranging from 5 to 11cm. Around 2.5 meters from the stern, a transverse bottom rib was carved to reinforce the hull. The rib was a triangular shape, about 60cm wide and 35cm high. Another rib was carved about 8 meters from the preserved stern (Erič 1994a, 1994b; Erič and Kavur 2012). Structurally the ribs are an interesting and rare element with a triangular shape in the longitudinal cross-section (Arnold 1996a, 1996b), but an oval curve up to 15cm in a transverse cross-section of the convex with the intersection. However, as the logboat was already severely damaged by lifting it, more than half is missing. About 4 m from the stern was a circular drilled hole with a diameter of 14cm, which was filled by a plug of soft wood.

During the examination of the logboat, wooden samples were taken for dendrological, conservation and radiometric analysis. The Dendrological investigation showed that the logboat was made of oak (Quercus robur). The sample from the plug could not be determined due to the extremely degraded condition and severely damaged cell structure. However, it was concluded that it could be one of a range of porous wood species, such
as poplar (*Populus*), walnut (*Juglans*), beech (*Fagus*), hornbeam (*Carpinus*) or maple (*Acer*). For possible future conservation of the logboat, they also performed investigations of the condition of the wood. Three samples were collected from three parts of the trunk at distances of 2.5m. Finally, a single sample was collected from the plug on the bottom (Fig. 4).

On the surface, small smoothed cleaved layers of wood were visible. Meanwhile, the inner side of the logboat showed a transverse hew with an average width of between 8 and 12cm, and some of them up to 22cm. It seems that the builders first cut an incision in the timber and then cut out a layer of rings. Later on, with the help of a chisel/wedge, the wood was chopped and lifted parallel to the course of the growth rings. On a surface area of 1m², up to 10 cuts were identified. It is believed that the logboat was carved using stone tools and the wedge was bone or antler (Fig. 5).
The first date, as detected by radiometric dating, gave us a date on the wood as 7,300 years old. Due to the suspicion that there was something wrong with the sample and the values obtained, we repeated the analysis that shows nearly the same age of the wood (Erič 1994b; Obilić et al. 1994). Dating was carried out 27 years ago, so the raw data was calibrated using modern software (Bronk Ramsey 2013).

Since the large standard deviations cover a relatively large time span, the first two dates overlap between the 61st and 59th centuries BC. However, for the third date with a significantly lower standard deviation, the time overlap is significant. Consequently, with respect on the standard deviation, we can assume that the 61st century BC is where the result ranges of three datings overlap. Although the samples for dating were taken from the exterior of the sides, bearing in mind the age of the tree, it
is believed that the logboat was built and in use at the end of the 7th and beginning of the 6th millennium BC.

The logboat from Hotiza was made at the time when the central part of the Pannonian Plain saw the first agricultural communities associated with Starčevo culture. Moreover, in the region, a rare archaeological site related to this culture has been discovered. Radiocarbon dates indicate that the logboat was made in a late Mesolithic cultural environment. Pollen and charcoal analyses from the sediments around the nearby Lake Balaton has shown that communities in this area occasionally burned vegetation and probably handled bigger trees since the beginning of the 8th millennium BC. In the humid period of the mid-6th millennium, an increase in Neolithic settlements sites were discovered, mainly located right on the edge of Lake Balaton, suggesting that residents took advantage of the acceptable living conditions in the region. These specific sites in humid environments suggest that we will see more preserved remains of vessels, which was partially confirmed by the discovery of the logboat from Keszthely, which would also date from the Mesolithic age (Bánffy 2006).

According to the available dating, the closest Early Neolithic archaeological sites concomitant to the Hotiza logboat, which could be classified in a previous stage of Starčevo culture, were a few hundred miles south-east in the southern region of Slavonia (Minichreiter and Krajcar Bronić 2006; Krajcar Bronić 2007). At these sites, the oldest hammer-axes were discovered, an excellent tool for woodworking. Today it is assumed that it was mainly environmental circumstances that dictated the expanded range of the oldest agricultural communities (Kertész 2002). However, they colonised a wider area of western Transdanubia at the
middle of the sixth millennium BC as a regional form of late Starčevo culture (Kalicz 1990; Oross and Bánffy 2009; Whittle et al. 2002).

Therefore, the logboat remains an extraordinary discovery. It stands out in its size, in its early choice of hardwood from a broad-leaf tree, in its technological solutions and finally in its alleged carving techniques. The logboat is an extraordinary discovery, which, depending on its age, can be classified in the Late Mesolithic despite of the lack of other artefacts (Burov 1996). Meanwhile, in the wider area of eastern Slovenia, northern Croatia and western Hungary, no other sites or artefacts from that time are known. This discovery illustrates a particular community lifestyle and provides hints of its organisational capabilities and sophisticated crafts skills, which were used to deal with life in an environment where the rivers were the principal communication routes.

The oldest logboats around the world

Logboats of a similar age is very rare, with the most extraordinary artefacts originating from northern and western Europe, though they are also known in China and Africa. The ancient knowledge of the technology of cutting and carving objects from wood is also evidenced by the increasing number of examined paddles. However, a few decades ago, a study was performed to describe a typology that would allow the dating of logboats by the design details. Unfortunately, this had no useful results, though they showed that the use of elements to reinforce vessels was first seen around 5000y ago (Hirte 1987; Lanting 1998). However, this thesis is unsustainable given the reinforcement on the logboat from Hotiza.

The oldest documented logboat is still the 8200y old 3m long and 45cm wide pine wood (Pinus) boat from Pesse in the Netherlands, discovered in 1956 (Van Zeist 1957). Whether this artefact was used as a vessel or possibly as a feeding trough, Dutch archaeologists have hotly discussed.
However, the results of the radiocarbon dating discussion were interrupted (Beuker and Niekus 1997). Meanwhile, with this discovery, it was shown that the cutting and carving technology was already known from stone ages in northern Europe.

Around the world, it was discovered several similar ages logboats (Fig. 6). Nandy / Le Coudray-Montceaux is the site in France where was discovered 8060y and 7990y old logboats (Bonnin 2000) and a 7900y old logboat were found in Noyen-sur-Seine near Paris in France (Mordant and Mordant 1989). Logboats more than 7000 years old include examples from from Dümmerlohasen in the north of Germany (7700y; Hirte 1987), Dufuna in north-east Nigeria (7670y; Breunig 1996; Garba 1996), Hotiza in the north-east part of Slovenia (7340y; Erič 1994a, 1994b; Erič and Kavur 2012) and finally a logboat from Kuahuqiao near Shanghai in China (7070y; Jiang and Liu 2005).
Fig. 6: Distribution of logboats older than 7000 year dated by radiocarbon dating.

After this short presentation, it is obvious that more than 7000 years ago, logboats were primarily carved from pine wood (*Pinus*), except for the one from Dufuna, carved from mahogany (*Khaya*), and from Hotiza made from oak (*Quercus*). The majority use of pine trees in the post-glacial period is almost predictable since its characteristics allow easy handling and especially because it was a dominant tree species in many regions around the world (e.g. Gumnior and Thiemeyer 2003; Carrión et al. 2010; Shang and Li 2010; Feurdean et al. 2014). However, at the end of the Atlantic Holocene and especially in the sub-boreal area, the pine tree slowly lost its dominance, and the oak tree started to dominate in many regions. Due to the general climatic changes, we can see that the oldest logboats (until the sixth millennia) were mainly made of pine wood and the more recent
logboats (until the second millennia) are made of oak (Arnold 1996a; 1996b).

Conclusion

The content of the presented studies is certainly insufficient for a description in an article since the final judgment of the experts was that in this case, the discovered trunk was not a human product but the result of an unexpected combination of natural environmental circumstances that made the trunk look similar to a logboat. Nevertheless, the result of this research also contributed valuable knowledge. First and foremost, the information is highly significant because we have discovered an 8,000-year-old tree trunk. We preserved an original that may hereafter provide referential data that can be applied to other sciences in the future for research purpose, such as paleo- environmental, botanical, hydrological and other kinds of studies. However, it is also an important message to archaeologists about the conscientious evaluation of research.

We have to be particularly vigilant when we are dealing with a fragmented artefact that does not contain enough trustworthy arguments to deciding on a human origin. In this case, from the beginning, the described object certainly provided adequate reasons to believe that it was a logboat. However, the later discovery of roots, tree bark on the outside and finally the insufficient traces of 'wood crafting' changed our conclusion. It presented a sufficient argument to conclude that this was not a logboat. However, if it were a logboat, it would certainly be among the three oldest in the world.


Krajčar Bronić, I., 2007. Određivanje starosti neolitičkog naselja Galovo u Slavonskom Brodu metodom radioaktivnog ugljika $^{14}$C. In K. Minichreiter


Biographies

Miran Erič, paint artist on Academy of Fine Arts, MSc in Archaeology at the Faculty of Arts and PhD candidate on Heritology, University of Ljubljana. Professional work from 1988 with 130 work publishing, employed by Institute for the Protection of Cultural Heritage of Slovenia since 2005. Before was 12 year as a scientific researcher at the University of Ljubljana. Researching fields: Underwater archaeology, Waterlogged Wood Conservation, Development of UW documentation, promote of Visual literacy in science, studies of Early Watercraft invention around the world. Instigator and founder of initiative” Early Watercraft - A global perspective of invention and development” with 55 ambassadors from 28 countries and all continents.

Evgen Lazar graduated archaeology at Department of Archaeology at the University of Ljubljana with the specialisation on early Slavic colonisation of east south of the Alps. PhD candidate on postgraduate programme Heritology at the University of Ljubljana. As a senior conservation officer, he works since 2008 at the Preventive Archaeology Center at the Institute for a protection of Cultural Heritage of Slovenia. As a field archaeologist, he is highly expert on the construction of the Slovenian highway cross. His professional interest growth from purely archaeological remains and sites to a wider spectrum of heritage conservation and professional disciplines concerning the protection of them.

Žiga Stopinšek finished Masters Degree at University of Ljubljana, Faculty of Computer and Information Science. During his studies, he joined the Computer Vision Lab where his work focused on 3D technology applications and documentation methodologies development in underwater archeology. He was awarded the Slovenian Student Prešeren Award for his Masters Thesis ”Segmentation and Reconstruction of Cultural Heritage based on Photogrammetric Point Clouds.” Since 2016, he is a senior engineer at Zemanta and from beginning of 2017 the co-founder of Agilicity, the company developing Modelur - a tool that empowers architects, designers, and planners to make well-informed decisions during the early stages of urban design.
Filipino Indigenous Boats: The Impact of Technical Change since the Colonial Settlement

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Abstract

The traditional boats of the Philippines were well adapted to local conditions in the islands. After the arrival of the Spanish colonialists in the sixteenth century, the authorities continued to use these vessels for carrying despatches and combating piracy. They also continued to be used in areas not under colonial control such as the Sulu Sea.

The experience of working in the Spanish shipyards in the construction of galleons introduced the Filipinos to new methods such as a new tool kit, metal hull fastenings, new sail plans, the central rudder and frame first construction. The Chinese immigration to the Philippines under the Spanish regime also introduced new skills and boat styles. The traditions behind the construction of indigenous boats survived, but were subject to significant modifications.

A number of vessels with mixed parentage emerged such as the lorcha, with a European style hull and a Chinese sail plan. Another example was the boteng pamunuanon, a traditional logboat but carved to resemble a European jolly boat in style. The casco was a barge from the sewn tradition, which was adopted in Manila.

In the twentieth century, after the American regime was established, the use of sails began to disappear, to be replaced by vehicle engines, pump engines or outboards. However the traditional outriggers were mostly retained. The Filipino name for these hybrid vessels in the local languages is the ‘pump boat’.

The modern ‘banca’ or ‘pump boat’ is a plank-built boat which looks similar to the traditional ‘caracoa’ or ‘balangay’ boats and still largely retain the v-shaped hull and the double outrigger design. However the construction methods and motive power have changed considerably. This process of modification has largely been undocumented.

Key words: Philippines, shipbuilding
Philippine Indigenous Boats

The Philippines is a significant country in Southeast Asia. The seven thousand islands have a land area larger than the UK. The population has now passed 100 million and this is the twelfth most populous country in the world. Currently, Filipinos are the largest maritime community in the world, with over 400,000 people employed at sea, mostly in foreign flag vessels. The Philippines is also now one of the largest shipbuilding nations in the world.

When the Europeans first arrived in the islands (which became the Philippines) in the sixteenth century, they found a well-established maritime culture and shipbuilding tradition. The islands were colonised by the Spanish and became an important entrepôt for trade between Spanish America and Asia.

According to the Spanish colonialists in the sixteenth century the boats used in the islands fell into two broad categories, logboats, carved from a single trunk (see Fig. 1), and plank-built boats (see Fig. 2) ((de Morga, 1609). There was also an important group of extended vessels, which were essentially logboats with extra strakes or washboards. This design was important in fitting out logboats for use with sails by extending the freeboard.
These vessels were characterised by the use of hand carved wood rather than sawn timber (in both logboats and plank-built boats) as the saw and the plane were not in common use at this time. The indigenous people used adzes, axes and jungle knives to cut the timber to shape and give
the hull the appropriate curvature by eye. There was abundant, excellent timber for boatbuilding and so a single tree would be carved into a logboat or provide two or more strakes for a plank-built boat.

The Europeans were familiar with logboats as they were common in Europe, Africa and the Americas. The Spaniards usually used the terms canoa or piragua for these vessels in their documents, although both these names come from the Caribbean (Blair and Robertson, 1904: Index).

What was an unusual feature for the initial European visitors was the use of outriggers for maritime vessels, a defining characteristic of these indigenous Philippine boats. This use of outriggers was largely limited to areas influenced by the culture of the Austronesian-speaking people in the Pacific and the Indian Ocean (Horridge, 1978: 3). Two of the earliest commentators on the outrigger were Pigafetta, the chronicler of the Magellan expedition and Dampier, the English buccaneer. Outriggers were usual on sea-going vessels to maintain lateral stability in heavy weather. They also provided additional buoyancy, especially where a vessel with a low freeboard was swamped, then the crew could leave the vessel so that they could bail it out whilst swimming. The outriggers were useful in allowing the doubling up of the rowing crew, and could facilitate manhandling a vessel in and out of the water efficiently.

A further defining characteristic of the plank-built boats was the use of wooden dowels and a lashed lug technology. The usual method of fixing the planks together was by the use of circular dowels fitting into the edges of the strakes. The size of these dowels was about 2-3 cm in diameter. The dowels were also used to fix the strakes to the stern and stern posts.
The boats were then lashed together using carved lugs, called tambuko, on the inside of the planks, and series of ribs or frames, called agar. This creates a strong hull shape suitable for open water use. These boats were, of course, frame first construction with the ribs added last. Horridge coined the phrase the lashed lug design for this style (Horridge 1978).

The larger vessels were these plank-built boats and these fell into various classes differentiated by role and size, including the balangay boat for general transport, and the caracoa for military purposes and raiding. These vessels were powered by paddles, oars, or sail or usually some combination of those.

**Early Trading Contacts**

There is comparatively little literary evidence of early maritime contact with other areas of Asia, but extensive early trade with other maritime cultures in Southeast Asia is demonstrated by the survival of trade goods from 1,000 BC onwards (Solheim, 2006: 3). However the traces of the ships used for this trade remain elusive in the archaeological record (Manguin, 1993). Early markers of this trade have included the distribution of similar styles of jade earrings and pendants across the region (Bacus, 2004: 263). The wide range of discoveries of the Sa Huynh-Kalanay pottery tradition particularly in Vietnam and the Philippines are a further link between Island Southeast Asia and the continental areas. From the first millennium BC, the highly identifiable dong son drums from Vietnam demonstrate that widespread regional trade did take place. These drums have been found distributed throughout Malaysia and Indonesia, to the south, but no examples have yet been found in the Philippines (Highham, 1996: 102-129). The major trade goods found in the Philippines were high
quality ceramics from China and Southeast Asia received in exchange for tropical goods (Brown, 1989).

Despite these extensive contacts with other maritime traditions, the local shipbuilding industry seems to have been resistant to foreign ideas and it is difficult to identify specific foreign technical influence in the Philippine indigenous boats of the pre-colonial era.

**The Impact of Spanish Colonisation**

A new trade route from China to the Americas through Manila provided an economic basis for the Philippine colony. The Spanish supplied silver from the American mines, which as in demand in Asia.

After the founding of the colony, the Spanish colonial authorities continued to employ boats built in the local tradition for use in the Philippines, as these were suitable for local conditions, particularly in crossing shallow coral reefs. They were used for communications, local trade and in seeking to suppress maritime raiders from the areas not under colonial control (Scott 1981: 1-38). This tendency to use traditional vessels in the administration of the Spanish colony continued into the nineteenth century.

The Spanish recognised the skills of the Filipinos as carpenters and shipbuilders. Initially they were employed by the Spaniards to repair their ships after the ravages of the long voyage from Mexico, but, with the plentiful supplies of timber and other materials available, the construction of European-style ships in the Philippines began at an early date.

The most important source for early Spanish shipbuilding in the Philippines is a paper by Sebastián de Pineda of 1619 titled, ‘Relación hecha por el... en cosas tocando a las Yslas Filipinas...’ translated as

One local trading vessel built to a Spanish design was the San Diego. This was a patache, used for inter-island trading (Desroches, J. P., Casal, G., Goddio, F., 1997). The vessel had been built in a yard on Cebu in 1590 and had a hull length of 57 feet (rather larger than the usual patache). When the Dutchman, Oliver Van Noort, blockaded Manila in 1600, this vessel was part of the Spanish fleet under the command of de Morga. It sank in the battle with the Dutch fleet south of Manila. The wreck was excavated in the 1990s by a joint expedition of the National Museum and the Frank Goddio organisation. The artefacts from this wreck are on display at the National Museum in Manila.

A number of smaller European-style vessels are recorded as being built and used in the Philippines during the Spanish colonial period including the pontin (a coastal trader), the pinnace (pinaza), the schooner (goleta), the shallop (chalupa) the scow (chalana) and various styles of galley including the fusta. Gallang mentions all these (1941: 291-306). A number of these vessels were illustrated on the margins of the Velarde Map of the Philippines of 1734 and were analysed by Horridge in the Brunei Museum Journal (Horridge, 1986).

The trading lifeline of the Spanish colony was the long-distance route to Acapulco in Mexico, which commenced at the founding of the colony. This was a distance of 9,000 nautical miles across the Pacific. This regular trade continued for 250 years from 1565 until 1815 and depended on the galleon, a large, rugged ship developed in the sixteenth century to maintain links with the Spanish colonies (Fernández Vial & Fernández Morante, 2013). The usual size of these galleons was up to 2,000 tons, up to 200ft in length and up to 50ft on the beam (Fish 2011, 156-162).
Most of the galleons for this trade were built in the Philippines due to the availability of quality timber, cordage, and other maritime raw materials. According to Pineda it was cheaper to build ships in the Philippines than in Mexico or Spain (Pineda, 1619: 174). Shipyards were constructed at a number of locations, especially at Cavite near Manila. Cavite was the port for servicing the galleons and was a protected anchorage, where they could be loaded and unloaded (de Morga, 1609: 254). However the location of these yards was based on the availability of materials, especially timber, and a local labour force. A sheltered, suitable beach was also a key requirement. Pineda refers to galleons having been constructed in the Philippine ports of Marinduque, Mindoro, Masbate and Camarines. In 1679 an order was given by the Spanish crown for all future ships for the Manila-Acapulco trade to be constructed in the Philippines (Schurz, 1939: 196). There are no accurate numbers of the galleons built in the Philippines, but Fish indicates the total was in the hundreds (Fish, 2011: 160).

The shipbuilding industry required large numbers of Filipino workers, working under the direction of Spanish (especially Basque) shipmasters. Massive amounts of labour were needed for cutting and transporting the timber for the ships, estimated as up to 2,000 trees per galleon (Fish, 2011: 129). The construction also required an extensive labour force in the yards and forced labour was used, although the labourers were usually paid.

Apart from the difference in size, the Spanish ships and galleons used a different technology from the traditional Philippine boats. They were built using frame-first construction and massive timber components joined by metal fastenings and fittings. The Spanish also introduced a new toolkit, particularly the saw and plane. The Filipinos were thus
exposed to a number of innovations which were eventually adapted for use in Philippine indigenous vessels. The use of iron nails as ship fastenings, referred to by de Morga, showed the early adoption of this technique in indigenous craft (de Morga, 1609: 253). The European central rudder was also promptly adopted for local craft to replace steering oars. Sails were soon universally made from local cotton canvas (abel) produced in Ilocos. The European-style oar was adopted for rowing in place of the traditional plate-shaped oar. As well as the indigenous rectangular lug sails, a number of local craft began to use European-style sail plans, with fore and aft sails raised on a pole mast rather than the original tripod masts.

The Influence of Chinese Migration

After the Spanish colonisation in the sixteenth century large scale migration from China began with the consent of the Spanish authorities. These settlers were based mostly in Manila where they provided commercial and skilled trades which were often alien to the native tradition. The importance of this inflow to support the economic development of Manila was recognised by the Spanish authorities. As many as 20,000 Chinese were reported as residents in Manila by 1600 (de Morga, 1609: 315). The Chinese introduced a different tool kit including the Chinese style saws and planes. They were particularly important in the production of ironwork for the shipyards, where they supplied most of the blacksmiths. Much of the raw iron was imported from China (Pineda, 1619).

The Chinese influence on local boats was not well documented, but the Chinese junk was used widely in the colony and for trade with China.
(Galang, 1941: 299). The Chinese did introduce the champan (or sampan) and the bancon for local trading. These were open boats up to 5 metres long, which were often sculled in the Chinese style. The Chinese batten sail was also widely adopted.

**The American Impact**

The USA seized the Philippines in 1898 following the Spanish American war. The most significant impact on local boatbuilding was the introduction of the diesel or gasoline motor which gradually replaced sails, paddles and oars as the primary source of power. In the American period, the local boats came to be known as pump boats, because of their noisy engines or perhaps because of the origin of the power unit. A pump boat is typically an outrigger vessel powered by a gasoline or diesel engine. Smaller vessels were be powered by the small, single-cylinder engine used to drive a water pump. Larger boats were powered by recycled car or truck engines.

**The Amalgam of Traditions**

From the sixteenth century, the impact of working in the Spanish shipyards and working alongside the recent Chinese immigrants had a significant impact on the technology used to build traditional Filipino vessels. The range of vessels used in the colonial period included ships of European, Chinese and local inspiration. This range of vessel types was extended as a result of the introduction of steam-driven vessels in the nineteenth century. Military gunboats using steam allowed the Spanish navy to finally suppress the Sulu slave raiders and control the Sulu Sea. Under the American colonial regime in the twentieth century diesel engines replaced sails even in smaller vessels built in the indigenous tradition.
In the colonial era the Philippine shipyards began to produce vessels which combined the Filipino, Chinese and European styles of ship construction. An example of this was the lorcha, which combined a European-style hull with Chinese-style batten sails and appears to have been widely used in the Philippines. According to Galang it was common in the Visayas where it was known as the batil (Galang, 1941: 300). It was also mentioned by de Morga as in use on the Chinese coast (de Morga, 1609: 137).

Fig. 3: The lorcha (or batil) from a model in the Ayala Museum in Manila.

The boteng pamunuanan was a logboat but carved to resemble the hull shape of European jolly boat style. This included a transom stern with a western style rudder (Admiralty Naval Intelligence Division 1944: 100-101).
The casco was a sewn vessel which was noted extensively in the nineteenth and twentieth centuries in Manila Bay and surrounding areas. The origin of the casco is a mystery. The vessel has a Spanish name, which means generically a helmet or ships’ hull, but there are no known references to this name before 1800, and no local name is recorded.

Similar sewn vessels have been used until recently on the Vietnamese coast such as the ghe-nòc and the thuyên song (Pietri, 1949: 17, 19). These had frameless, flat-bottomed hulls and were sewn from the inside with wooden wedges over the seams, but without dowels. There is some similarity between the wooden wedges used in the sewn vessels of Vietnam and the casco of the Philippines, which suggests that this was an imported design from Vietnam or the Chinese coast. This was a kind of lighter used as a houseboat and cargo carrier in Luzon, and described by Paris as ‘a cargo vessel, which sailed on the lake (Laguna de Bai) and the Pasig River, which would only go to sea during the calm days of the North East Monsoon. Rectangular in shape, the bow alone is slightly elevated and the stern with a long rudder is flat; the frame is formed with large planks stitched irregularly with small flat lashings covered with white caulking…’ (Paris, 1841: 67, translated by the author).
There are no known surviving examples and no traces in the archaeological record. However this design seems to have been used extensively in the nineteenth and early twentieth centuries and there are numerous photos available.

![Cascos under sail near Manila, from Paris, 1841: Pl 73](image)

**Fig. 5: Cascos under sail near Manila, from Paris, 1841: Pl 73**

**Local Craft Used Today**

How much do the traditional styles of vessel survive in the modern Philippines? Little has been written on the development of Philippine boats in modern times, which is surprising given the huge numbers of these vessels still in common use.

Logboats are still produced in the traditional manner in the Philippines and are used by local communities primarily for fishing in coastal and inland waters. With the dwindling resource of suitable hardwood logs, and the value such timber now has in the market, the timber is often replaced by fibreglass hulls or cheap marine plywood canoes. It is encouraging to find
areas such as Samar and Mindanao where timber is still available and the original dugouts continue to be produced in the traditional style.

The category of extended logboats has largely disappeared, along with the large sail plans on logboats, which required a higher freeboard for sailing offshore.

Local fishing and water transport in the Philippines is still dominated today by the banca (or bangka in Tagalog), which reflects an amalgam of traditional Philippine plank-built boats with an admixture of European and Chinese technology. Originally, the banca was sailed or paddled, but today most are motorised. The typical banca of today has a double outrigger and a narrow plank-built hull. The western rudder has completely replaced the steering oar. As noted above, they are often referred to today as pump boats and remain a standard utility boat in the Philippines, used for nearly everything from inter-island transportation, to leisure, fishing and now scuba diving.

The modern banca has a narrow, v-shaped hull, like the traditional planked vessels, but is now usually built frame-first using timber members or steel bolts and fittings. The body can be built in metal, but the majority of bancas are still built in wood. The strakes are now sawn rather than carved timber, and the original dowel fittings have disappeared. Interviewing the builders in the Visayas, they still prefer to use lauan wood (dipterocarpus thurifer) for the keel, tugas wood (vitex pariflora - molave in Spanish) for the stem and stern and apitong wood (dipterocarpus grandifloras) for the frames and strakes. These are all local wood sources widely used in traditional boat building. Outriggers of bamboo are still utilised for these vessels to give lateral stability, which means they are more convenient when operated from a beach rather than a modern jetty.
There is a photo essay on You Tube showing the construction of a modern banca on Malapascua Island, Northern Cebu (You Tube: A Filipino Pump Boat built on the beach by Evolution.m4v). The author visited Malapascua Island in 2017 to observe the construction of bancas in that yard. Thus, the tradition of the pre-colonial vessels lives on in the Philippines, albeit with practical adaptations to the modern world (Fig. 6).

Fig. 6: An amalgam of traditions – a modern banca at Negros. (Photo: M R Stead)

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Session 13: The Archaeology of Manila Galleons, Past, Present and Future

This session will focus on a specific part of the rich maritime history of the Asia Pacific region, the Manila Galleons. These ships traversed between continents surrounding the Pacific, transporting goods from India and China to Peru and Spain via New Spain, for 250 years, changing the cultural landscape of South East Asia and America, transforming cultures, peoples, technology, spreading ideas, plants and customs, among many other significant processes. This session explores the archaeological work done to date in regard to these ships and the work being done now in several parts of the world. Furthermore, the session will explore the future ways in which this topic can contribute to present societies. In regard to past works, papers from the excavations done on the Concepcion in the Mariana Islands, and the San Diego in the Philippines are a good opportunity for archaeologists that worked decades ago to present part of that research in a new light as well as present work not yet available to researchers.

Current works from the Philippines, Spain, Japan, USA, and Mexico will be presented. In this part of the session, interesting points of contact between projects and researchers will be encouraged. Different methodologies and research strategies will help projects see their strong points and adapt new ones. Trade, nautical archaeology, among other topics can be presented. Current works will demonstrate that the topic is very much alive and growing. Papers on future research objectives can contribute to map the road ahead, looking at different lines of inquiry related to the Galleons.

Above all, the session seeks to make this research topic a celebration of diversity and common heritage that brings people together in our common cultural traits and admiration for our differences. The session will bring interested researchers together to collaborate in the diverse projects.

Session Chairs: Mr. Roberto Junco
Early sixteenth-century shipbuilding in Mexico: Dimensions and tonnages of the vessels designed for Pacific Ocean navigation

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Abstract

Shortly after the conquest of Mexico, Cortes ordered the construction of a second shipyard on the Pacific coast, known as El Carbón, in addition to the shipyard of Zacatula (Guerrero). The new shipyard was located in Tehuantepec (Oaxaca) and shipwrights were brought to Mexico to build and repair the ships for the spice trade with the Moluccas Islands, and even China and Japan. The ships built in this shipyard included the galleons San Vicente, San Lázaro, and Santa Agueda which were employed in trade with Peru, and the exploration of the Pacific coast of Mexico and California. These vessels were among the earliest ships built in the Pacific Ocean according to the European shipbuilding tradition. This paper examines the information provided by a document dated to 1535, in which the main dimensions, tonnages, and construction characteristics of three navíos (ships) built in El Carbón – San Lázaro, Santiago, and Santa Agueda – are provided. Interestingly, the linear units provided by the document are Portuguese goas instead of the expected Spanish codos (cubits), although the tonnages are expressed in Spanish pipas from Seville. Further, this paper compares the characteristics of these ships with other contemporary vessels built in the shipyards of Mexico for navigation in the Pacific Ocean. Finally, a comparative analysis is conducted to discover the similarities and differences between the designs and tonnages of the Pacific coast-built ships and those designed for the Atlantic fleets.

Key words: Manila Galleons, shipbuilding, Mexico
Introduction

After the fall of Tenochtitlan, Cortes sent expeditions to the Pacific coast to find a maritime passage between the Atlantic and the Pacific Oceans. One of these expeditions led to the construction of the El Carbón shipyard in Tehuantepec (Oaxaca), in addition to the existing shipyard of Zacatula (Guerrero) (Pérez and Luna, 2016). The construction of these shipyards was probably part of a larger strategy to find the shortest route to the Moluccas Islands to control the spice trade from Asia, open trade routes between Mexico and Peru, and explore the Pacific coast of the American continent (Sandoval, 1950; Pérez and Luna, 2016). The shipyard of El Carbón was to become as a stop on the spice trade route, while Tehuantepec offered a base to explore the South Sea (Pérez and Luna, 2016).

Both Zacatula and Tehuantepec were natural ports where ships could be repaired and built (Pérez and Luna, 2016). The shipyard of Tehuantepec had a strategic position in comparison to other ports such as Acapulco because it was located at the mouth of the river Tehuantepec, near today’s Port of Salina Cruz (Huatulco) (Sandoval, 1950; De Paz, 2006). One of the difficulties of shipbuilding on the Pacific coast of Mexico in the early 16th century was the provision and transport of materials, excluding the exception of wood. The rest of the materials had to be brought from the port of Veracruz, on the Atlantic coast of New Spain. The construction materials were transported by sea from Veracruz to Guazacualco (Coatzacoalcos), and then on canoes through the Isthmus of Tehuantepec just 20 leagues from the shipyard of El Carbón. Only the last stretch of the route had to be done on land. As such, it was cheaper and faster to bring the materials to El Carbón than to other destinations such as Acapulco (Sandoval, 1950; De Paz, 2006). Moreover, the timber and
the workforce needed to build and repair the ships were provided by the encomiendas established in the region of Mixteca Alta (Pérez and Luna, 2016). El Carbón became central to Cortés’ maritime projects in the Pacific since the last years of the 1520s, until it was transferred to the Spanish Crown in 1560 (De Paz, 2006).

The document

A document dated on May 20th, 1535, in El Carbón describes three of the earliest vessels that Cortés built in México: San Lázaro, Santiago, and Santa Agueda.¹ These vessels were designed for trade with Peru, and the exploration of the Pacific coast of Mexico and California (De Paz, 2006).

The document presents the results of the survey conducted to verify if the ships (navíos) Santiago and Santa Agueda were built according to the contract signed between Hernán Cortés and Juan Martínez, Cortés’ master shipwright. The contract specified that these vessels were to be built in El Carbón with a design based on the ship San Lázaro.² Their keel (quilla) length was to be the same as San Lázaro’s while increasing their floor length (plan) and breadth by two and three palmos. Their other dimensions would be based on these. They were also expected to have a shallow draft without exceeding six palmos. Their hull configuration included a main deck (cubierta), an upper deck (puente) fitted with hatches (cuarteles), and a fore- and a sterncastle (alcázares). Both ships would be delivered with masts and yards, pumps, and longboats including their oars.³

The new ships, however, became larger than initially planned and, therefore, a survey was conducted to verify the variations with respect to their original design. The survey would determine the payments for the extra work carried out on both vessels. The ship Santiago was still under
construction while Santa Agueda was already completed. The document, however, only listed San Lázaro's main dimensions and Santiago's tonnage. Santa Agueda's dimensions were not mentioned in the document although the payments agreed for both vessels were identical.

Juan Suarez, the mayor of Tehuantepec, summoned a committee in El Carbon to survey the vessels, and to declare which were the differences in relation to their original design. The committee members were Juan Martínez, the master shipwright of El Carbón; Juan de Minuxca, the shipwright of the ship Santiago; Fernán Díaz, a Portuguese master shipwright; Pascualín de Pierro, a Venetian carpenter (Sandoval, 1950); and Diego Hernandes, a cooper. After surveying the ships, the committee declared that Santiago's shipwrights, carpenters and caulkers deserved a payment of 300 pesos for all their extra labor. Juan Suarez, on the other hand, proposed a payment of 200 pesos for each vessel for all the changes and extra work. At the end, the 200 pesos deducted from the initial estimation were distributed between Díaz and Martínez to complete the vessels.

The survey

The ships were surveyed using a Portuguese goa instead of a codo castellano (Castilian cubit), or a codo de ribera (shipyard cubit), as it was customary in Spain. The goa belonged to the mayor shipwright Juan Martinez, who gave it to the mayor Juan Suarez for the survey. Therefore, the document provides all the ships' measurements in goas and palmos. The goa was a Portuguese linear unit used to measure the keel of small vessels, such as brigantines (bergantines), frigates, and small boats (bateles). One goa equaled 3 palmos de goa, which was the linear unit used to measure the ship's breadth, depth of hold or deck height, and scantlings (Table 1) (Oliveira, 1991; Lavanha, 1996).
The main linear units used in Spain to build and measure vessels were the *codo castellano* and the *codo de ribera*. The *codo castellano* equaled to 2/3 of a *vara castellana* (Castilian yard), or 32 *dedos* (fingers), and was mainly used in the Atlantic coast of southern Spain, for the ships of the Indies run (Table 1) (Casado, 1991). This was *codo* used in Palacio’s, Cano’s, and probably Escalante’s, treatises to refer the ship’s dimensions (Cano, 1964; Escalante, 1985; Palacio, 1985). The *codo de ribera* measured 2/3 of a *vara castellana* plus 1/32 of the *vara*, or 33 fingers, and was used in the shipyards of the Biscayan coast, in northern Spain (Table 1) (Casado, 1991). In 1590, it became *the codo real* (royal cubit), the standard linear unit to survey and calculate ships’ tonnages, when Philip II decreed the standardization of all naval measurements to prevent fraud (Casado, 1991).

### Table 1. Linear Units.

<table>
<thead>
<tr>
<th>Units</th>
<th>Equivalence</th>
<th>Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goa</td>
<td>3 palmos de goa</td>
<td>0.77</td>
</tr>
<tr>
<td>Palmo de goa (palm of goa)</td>
<td>-</td>
<td>0.256</td>
</tr>
<tr>
<td>Vara Castellana (Castilian yard)</td>
<td>48 dedos</td>
<td>0.836</td>
</tr>
<tr>
<td>Dedo (finger)</td>
<td>-</td>
<td>0.017</td>
</tr>
<tr>
<td>Codo Castellano (Castilian cubit)</td>
<td>2/3 vara castellana = 32 dedos</td>
<td>0.557</td>
</tr>
<tr>
<td>Codo de Ribera (Shipyard cubit)</td>
<td>2/3 vara castellana = 32 dedos + 1/32 = 33 dedos</td>
<td>0.575</td>
</tr>
</tbody>
</table>

**The ship San Lázaro**

According to the survey, *San Lázaro* had a length of 19 *goas* and 1 *palm* a breadth of 19.5 *palmos*, a depth of hold of 7 *palmos*, with the upper deck located 5.5 *palmos* above the main deck (Table 2). The surveyors also mentioned that *San Lázaro* had no upper works, including bulwark
(mareaje), fore- (castillo) and sterncastle (tolda), and not even ridding bitt (guindaste). The absence of upper works matches the Palacio’s description about the ships built for the coast of Peru, Nicaragua, Guatemala, and the South Sea. According to Palacio, these vessels were built flat (rasos), with high runs and entries, and full round sides because they always sailed close to the wind (Palacio, 1985). Unfortunately, the document did not mentioned San Lázaro’s tonnage, or any other reference to its hull dimensions and construction details.

Table 2. Ships Dimensions.

<table>
<thead>
<tr>
<th>SHIP Navío</th>
<th>LENGTH Esloria</th>
<th>BREADTH Manga</th>
<th>DEPTH OF HOLD Main deck Puntal Cubierta</th>
<th>UPPER DECK Puente</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Lázaro</td>
<td>19 goas 1 palmo (58 palmos)</td>
<td>19.5 palmos</td>
<td>7 palmos</td>
<td>12.5 palmos (+5.5)</td>
</tr>
<tr>
<td>Meters</td>
<td>14.89</td>
<td>4.99</td>
<td>1.79</td>
<td>3.2 (+1.41)</td>
</tr>
<tr>
<td>Codo de Ribera</td>
<td>25.89</td>
<td>8.68</td>
<td>3.12</td>
<td>5.57 (+2.45)</td>
</tr>
<tr>
<td>Codo Castellano</td>
<td>26.73</td>
<td>8.96</td>
<td>3.22</td>
<td>5.75 (+2.53)</td>
</tr>
<tr>
<td>Santiago</td>
<td>24.5 palmos (+5)</td>
<td>-</td>
<td>-</td>
<td>19.5 (+7 palmos) Includes bulwark</td>
</tr>
<tr>
<td>Meters</td>
<td>-</td>
<td>6.27</td>
<td>-</td>
<td>4.99</td>
</tr>
<tr>
<td>Codo de Ribera</td>
<td>-</td>
<td>10.91</td>
<td>-</td>
<td>8.68</td>
</tr>
<tr>
<td>Codo Castellano</td>
<td>-</td>
<td>11.26</td>
<td>-</td>
<td>8.96</td>
</tr>
</tbody>
</table>

The ship Santiago

The set of dimensions provided for Santiago was less detailed than the one listed for San Lázaro. The survey revealed that Santiago’s breadth and length of floor were 5 palmos wider than originally planned. Santiago’s hull was also 7 palmos higher than San Lázaro’s, including both decks and bulwark (Table 2). The document did not specify the depth of hold,
the height between decks, or even the height of the bulwark. Therefore, it is impossible to determine how the extra 7 palmos were distributed along the total height of the hull. The surveyors also mentioned that the keel of *Santiago* was longer than *San Lázaro*'s although no dimension was provided.\(^\text{11}\)

*Santiago* had a fore- (*castillo*) and a sterncastle (*tolda*) above the upper deck, and was fitted with a riding bitt (*guidaste*), and sheer blocks (*escoteras*). The ship’s extra hull features included stringers (*palmejares, escoas, and contraescoas*) from bow to stern, two rows of clamps or inwales (*carreras de dragas*), and 24 knees (*corbatones*) more than *San Lázaro*. In other words, *Santiago*'s hull was more strongly built than *San Lázaro*'s. The shipwright Hernán Díaz justified these modifications saying that it would have been impossible to build a seaworthy vessel following the original design specifications. Therefore, the shipwrights had to increase the dimensions of the ship *Santiago*, and to add the extra hull features observed during the survey.\(^\text{12}\)

Additionally, the surveyors Fernán Díaz, Diego Hernandez, and Juan de Minuxuca calculated *Santiago*'s tonnage after measuring the vessel although they did not include its main dimensions in the document. The ship’s tonnage, however, was indicated in *botas* (butts) and *pipas* (pipes) from Seville instead of Portuguese tons, or even Spanish *toneles* or *toneladas*. The calculations revealed that the volume of *Santiago*'s hold measured up to the main deck was 95 Sevillian *botas*. On the other hand, if the space between the main and upper deck was added the calculation, the ship’s total tonnage increased up to 128 Sevillian *pipas* (Table 5).\(^\text{13}\)
Ships ratios

The dimensions provided for *San Lázaro* allow for the calculation of its hull ratios for comparison with other 16th-century ship types and shipbuilding treatises. The aim of this analysis is to verify the design variations between the ships built for the South Sea and those for the Indies run. The analysis will also determine if the vessels built in El Carbón were designed as warships, merchant or multipurpose vessels. Unfortunately, *Santiago*’s partial set of dimensions prevents the calculation of its hull length-to-breadth ratio, and only an approximation to its depth of hold-to-breadth ratio.

According to the main dimensions of *San Lázaro*, the ships had a length-to-breadth ratio of 2.98, and a depth of hold-to-breadth of 0.36 (Table 3). *San Lázaro*’s length-to-breadth ratio is almost identical to the traditional *As-Dos-Tres* rule that, according to Cano, regulated the 16th-century ship design in Spain, Italy, and other nations. This rule determined that for each unit of breadth, there were two units of keel and three of length (Cano, 1964). The fact that *San Lázaro*’s length was almost three times its breadth would confirm that the longitudinal dimension provided in the document refers to the hull’s length and not to the keel.

The hull of the 24M ship of Red Bay (Canada) also presented a similar length-to-breadth ratio to San Lazaro’s with 2.81 (Table 3) (Loewen, 2007[3]). The 24M Ship of Red Bay (Canada) has been tentatively identified as the Basque galleon or *nao* whaler *San Juan* from Pasajes (Guipúzcoa, Spain), which sank in Red Bay Harbor (Canada) in 1565 (Bernier and Grenier, 2007[4]). On the other hand, the *naos* built in the northern coast of Spain had a higher average length-to-breadth ratio than *San Lázaro* with 3.2 (Casado, 1991). Moreover, the average ratio lowered to 3.07 for *naos* that took part in the Armada of 1588 (Casado, 1988). The
nao was the most common vessel built in the northern coast of Spain for trade; although not specifically designed as a warship, it could also be armed for naval warfare (Casado, 1988). These ratios, however, were too low in comparison to those of the galleons designed and built specifically as oceangoing warships during the second half of the 16th century. For instance, the 12 small galleons or galeoncetes that Pedro Menéndez de Aviles built in Biscay between 1567 and 1569 had a length-to-breadth ratio of 3.52 (Casado, 1988). Finally, Escalante and Palacio ships design of the last quarter of the 16th century, also had higher length-to-breadth ratios of 3.18 and 3.21 for multipurpose oceangoing vessels (Table 3) (Escalante, 1985; Palacio, 1985).

Table 3. Ships Ratios.

<table>
<thead>
<tr>
<th>Ship</th>
<th>Type</th>
<th>L/B</th>
<th>DOH/B</th>
<th>B/F</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Lázaro (1535)</td>
<td>Navío</td>
<td>2.98</td>
<td>0.36 (0.69)</td>
<td>-</td>
</tr>
<tr>
<td>Santiago (1535)</td>
<td>Navío</td>
<td>-</td>
<td>(0.84)</td>
<td>-</td>
</tr>
<tr>
<td>As-Dos-Tres (16th cent.)</td>
<td></td>
<td>3</td>
<td>(0.75)</td>
<td>0.30</td>
</tr>
<tr>
<td>24M Ship (1565)</td>
<td>Galleon/Nao</td>
<td>2.81</td>
<td>0.53</td>
<td>-</td>
</tr>
<tr>
<td>Naos (16th cent.)</td>
<td>Merchant</td>
<td>3.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Naos Armada (1588)</td>
<td>Armed merchant</td>
<td>3.07</td>
<td>0.67</td>
<td>-</td>
</tr>
<tr>
<td>Galeoncetes (1567)</td>
<td>Warship</td>
<td>3.52</td>
<td>0.60</td>
<td>-</td>
</tr>
<tr>
<td>Escalante (1575)</td>
<td>Multipurpose</td>
<td>3.18</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Palacio (1587)</td>
<td>Multipurpose (Atlantic Ocean)</td>
<td>3.21</td>
<td>0.49 (0.71)</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>Multipurpose (Pacific Ocean)</td>
<td>-</td>
<td>0.5</td>
<td>0.25</td>
</tr>
</tbody>
</table>

San Lázaro's depth of hold-to-breadth ratio, on the other hand, was only 0.36, with a depth of hold slightly over 3 codos (Table 3). This was a low ratio in comparison to other 16th-century vessels and also a very shallow depth of hold. For instance, the 24M ship depth of hold-to-breadth ratio was 0.53, almost half of its breadth (Loewen, 2007[3]). The average ratio of the naos that took part in the Armada of 1588 was 0.67, while the galeoncetes of Menéndez de Avilés presented a ratio of 0.60 (Table 3)
(Casado, 1988). Escalante did not provide a depth of hold-to-breadth ratio in his treaty, but he specified that the depth of hold was measured up to the main deck, and was derived from the height of the entries and runs (raseles) (Escalante, 1985). Finally, Palacio’s design of a multipurpose oceangoing vessel presented a ratio of 0.49, slightly lower than the 24M vessel but still higher than San Lázaro (Table 3) (Palacio, 1985).

Palacio, on the other hand, mentioned that the depth of hold of the ships built for the coast of Peru, Nicaragua, Guatemala, and the South Sea corresponded to half of their breadth (Palacio, 1985). However, Palacio’s design of an oceangoing multipurpose Ocean indicates that the depth of hold (puntal) equals to 1/3 of the keel, and corresponds to the vertical height measured from the top of the keel to the upper deck (Palacio, 1985). It is unclear if, in the case of the ships for the Pacific Ocean, the definition of depth-of-hold (puntal) includes the total height of the hull. Cano also mentioned in his treaty that the depth of hold was traditionally measured up to the upper deck in Portugal and Andalusia, and even in Biscay in the past. In fact, the depth of hold equaled to 3/4 of the ship’s breadth (Cano, 1964). If this is the case, San Lazaro’s depth of hold-to-breadth ratio would increase up to 0.69, higher than the ratio Palacio recommended for the Pacific Ocean ships. However, Palacio’s oceangoing multipurpose vessel ratio would become 0.71, similar to the traditional ratio mentioned in Cano’s treatise. In contrast, the approximate ratios for Santiago’s would become 0.84, exceeding all the recommendations included in the shipbuilding treatises (Table 3).

Finally, Palacio indicated that the length of floor-to-breadth ratio for the oceangoing multipurpose vessel was 0.3, as Cano mentioned in his treatise, while it was reduced to 0.25 for the South Sea ships (Table 3) (Palacio, 1985; Cano, 1964). Unfortunately, the document does not
mention the lengths of floor for San Lázaro and Santiago to check this hypothesis. However, it mentions that Santiago’s length of floor was to increase 3 palmos with respect to San Lázaro’s.15

San Lázaro’s hull ratios depict a vessel with a wide and short hull as that corresponds to a merchant vessel whose design advocated for wider breadths to maximize stability. The shallow hull, however, would limit San Lazaro’s cargo capacity; San Lazaro was conceived neither as a warship nor as merchant vessel. On the other hand, the low depth of hold-to-breadth ratio was appropriate for exploration vessel or coastal trade due to its shallow draft. This design favored the ship’s maneuverability and capacity to sail close to the wind, two desired traits for an exploration vessel.

Ships tonnages

The document only provides Santiago’s tonnage although San Lázaro’s volume can be calculated using its measurements and a series of contemporary 16th-century Spanish formulas. Therefore, San Lázaro’s tonnage can be compared with Santiago’s and other contemporary ships used for the navigation in the Pacific Ocean to determine if they fit within the range of tonnages that Palacio mentioned in his treatise. According to him, the tonnages of the vessels built for the South Sea ranged between 50 and 100 toneladas, while he recommended a tonnage of 400 toneladas for the oceangoing multipurpose vessels (Palacio, 1985).

During the 16th century, ships’ tonnages were calculated in Spain using a series of arithmetic formulas which provided the ships volumes in toneles (casks). One tonel equaled to two pipas of wine or eight cubit codos, although a tonel macho was about 10 percent larger than a tonel from Andalusia that was calculated using codos castellanos. The
*tonelada*, on the other hand, was a unit of freight which equaled to one tonel plus a 20 or 25 per cent of the estimated tonnage of the vessel. The additional 20-25 per cent included the spaces above the vessels’ main decks and upper works, and was a bonus for the owners in addition to the basic rates of hire paid by the Crown (Table 4). The distinction between *tonelada* and *tonel* slowly disappeared from the mid-16th century till 1590 when Philip II standardized the linear and volume units used in Spain for shipbuilding and the tonelada became the same as the *tonel* (Casado, 1991).

One of the formulas to calculate the ship’s tonnages was used in the northern coast of Spain between 1520 and 1590. This formula was based on the *codo de ribera* and provided the tonnages in *toneles machos* which equaled to 8 cubic *codos de ribera* (Table 4) (Casado, 1988). In 1590, this formula and the *codo de ribera* became the standard system to gauge ships’ tonnages (Casado, 1988). Another formula based on the *codo castellano* was used in Seville and Cadiz between 1570 and 1590, and provided the ships tonnages in *toneles* of eight cubic *codos castellanos* (Table 4) (Casado 1988). These formulas were practically identical but the one used in northern Spain reduced the result by 5 percent. This reduction was to take into account the loss of hull volume due to the entries and runs (*raseles*) (Table 4) (Casado, 1988).
Table 4. Tonnages Units and Formulas.

<table>
<thead>
<tr>
<th>Tonnage Units (Volume)</th>
<th>8 Cubic Codos Castellanos</th>
<th>1.3844 cubic meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonel (Seville)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonel macho (Biscay)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Cubic Codos de Ribera</td>
<td></td>
<td>1.5183 cubic meter</td>
</tr>
<tr>
<td>Freight Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonelada</td>
<td>Tonel macho or Tonel (Seville) + 20%-25%</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Tonnage Units and Formulas

Therefore, to calculate the tonnage of San Lázaro required conversion of the goas and palmos into codos castellanos and codos de ribera (Table 5). According to the formulas, San Lázaro has a tonnage of 42.74 toneles machos or 49.5 toneles, which correspond to the volume of the ship’s hold (Table 5). If the 20 per cent was added to these tonnages to account for the space between decks, the total ship’s volume increased to 51 and 59 toneladas. The variation in the tonnages depended on the linear units used to measure the vessel, and the calculation formula.
Table 5. Ships Tonnages.

<table>
<thead>
<tr>
<th>SHIP</th>
<th>LENGTH</th>
<th>BREADTH</th>
<th>DEPTH OF HOLD (main deck)</th>
<th>Tonnage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Toneles</strong></td>
</tr>
<tr>
<td><strong>San Lázaro</strong></td>
<td>19 goas 1 palmo (58 palmos)</td>
<td>19.5 palmos</td>
<td>7 palmos</td>
<td>-</td>
</tr>
<tr>
<td>Codo de Ribera</td>
<td>25.89</td>
<td>8.68</td>
<td>3.12</td>
<td>42.74 (Biscay)</td>
</tr>
<tr>
<td>Codo Castellano</td>
<td>26.73</td>
<td>8.96</td>
<td>3.22</td>
<td>49.50 (Seville)</td>
</tr>
<tr>
<td><strong>Santiago</strong></td>
<td></td>
<td>24.5 palmos</td>
<td></td>
<td>95 botas (Seville)</td>
</tr>
<tr>
<td>Codo de Ribera</td>
<td>-</td>
<td>10.91</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Codo Castellano</td>
<td>-</td>
<td>11.26</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Document, 1520s</td>
<td></td>
<td></td>
<td></td>
<td>100-150</td>
</tr>
<tr>
<td>Document, Mid-16th cent.</td>
<td></td>
<td></td>
<td></td>
<td>100-150</td>
</tr>
<tr>
<td>San Lucas, 1564</td>
<td></td>
<td></td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>San Juan, 1564</td>
<td></td>
<td></td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>Palacio, 1587</td>
<td></td>
<td></td>
<td></td>
<td>50-100</td>
</tr>
</tbody>
</table>

Table 5. Ships Tonnages

The tonnage of *Santiago*, on the other hand, appears in the document expressed in Sevillian *pipas* and *botas*. Therefore, the tonnages need to be converted into *toneles* to compare them with other vessels including *San Lázaro*. According to a 1496 document in Seville, one *tonelada* of freight corresponds to one *tonel macho*, two *pipas* or one *tonel*, while five *botas* equaled to three *toneles* (Loewen, 2007[3]). Therefore, *Santiago*’s hold would have an approximate tonnage of 57 *toneles*. The surveyors also calculated the volume of the space between the main and upper deck which increased the total tonnage of the vessel to 128 *pipas* or 64 *toneladas*. This value was only four *toneles* lower than the resulting 68 *toneladas* after adding the extra 20 per cent to the original tonnage of the ships hold (Table 5). *Santiago*’s tonnage was larger than *San Lázaro*.
taking into account that *Santiago* was conceived and built as a larger vessel. Unfortunately, it is impossible to calculate the tonnage of *Santiago* using any arithmetic formulas since the document does not provide its main dimensions.

Despite the linear units of formulas used to calculate the ships’ volumes, both vessels show tonnages ranging between 51 and 68 toneladas. These values are within the tonnages that Palacio recommended for vessels built for Pacific Ocean navigation which ranged between 50 and 100 toneladas (Palacio, 1985). In fact, a document dated to the 1520s specified that the tonnages of the ships built for the navigation to the Moluccas should have a maximum tonnage of 150 toneles and a minimum of 100 (Fernández de Navarrete, 1971[16]). Similar recommendation about the size of the vessels were included in another document dated circa the mid-16th century with instructions about the ships to be bought in Nicaragua and Panama to sail to the Moluccas (Munuera, 2016). Even two of the first Manila galleons had tonnages between 40 and 80 tons (Junco, 2016) (Table 5).

*San Lázaro, Santiago, and Santa Agueda* are referred in the document as *navíos* (ships)-the same type as two of the vessels that Saavedra used to depart from Zihuatanejo in 1527 for the Moluccas (Fernández de Navarrete, 1837[5]). This ship type had tonnages ranging between 50 and 100 tons, as Palacio recommended in his treatise, and were used for coastal trade but could also serve for long distance navigation. When *navíos* were part of an Armada, they were named *pataches* (dispatch vessels) or auxiliary vessels. Palacio, defines these ships as small vessels that provide service to larger ones (Casado, 1988; Casado, 1991).
Conclusions

This document reveals the various shipwrights and shipbuilding traditions that were present in the shipyards of the Mexican Pacific coast during the early 16\textsuperscript{th} century period. The presence of Spanish, Portuguese and Venetian shipwrights and carpenters in El Carbón indicates that at this stage the technical knowledge to design and built vessels was brought from Europe. Ships were needed for exploration and trade in the Pacific Ocean, and the knowledge to build was brought over as were shipbuilding materials. Therefore, the ships built in El Carbón were the result of this technical mixture.

The ship type described in the document is the navío, a relatively small vessel that seems to dominate the ship typology in this area in the early 16\textsuperscript{th} century. This vessel was used for the exploration of the Pacific coast of Mexico and for trade with Peru. Moreover, navíos are among the first European vessels that sail directly from the American continent to the Moluccas and Philippines across the Pacific Ocean. Their design was well adapted to the Pacific Ocean navigation and lasted till the later 16\textsuperscript{th} century. However, the information provided in the document is limited and further research is needed to clearly define the design and characteristics of this ship type.

Endnotes

\begin{enumerate}
\item Archivo General de la Nación, Indiferente Virreinal, caja 1719, exp. 13, Hospital de Jesús, 1535, 4 fs.
\item Archivo General de la Nación, Indiferente Virreinal, caja 1719, exp. 13, Hospital de Jesús, 1535, Folio 1v.
\item Archivo General de la Nación, Indiferente Virreinal, caja 1719, exp. 13, Hospital de Jesús, 1535, Folios 1v-f2
\end{enumerate}
Palacio’s multipurpose oceangoing vessel could be used for Atlantic and Pacific Oceans navigation.

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Seeking Manila Galleon Trade Network through Exported Chinese Ceramics

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Abstract

The Manila Galleon Trade was not merely trade between Manila and Acapulco but was a trade that connected Asia to America and further to Europe. Excavated Chinese ceramics show the wide spread network of this trade, from China to Manila and Acapulco to almost all American societies throughout the colonial period. It is important that we recognize this complex trade network that spread from both ends such as Macao, Malacca, Coastal India, Japan, and Taiwan from Manila and on the other end, it was further connected to Lima, Caribbean islands and coasts, and to Spain.

In this session, the speaker would analyze the wide distribution of Chinese ceramics related to Manila Galleon Trade especially Macao, Mexico, Lima and Spain. Both continuity and discontinuity can be observed among the excavated Chinese ceramics especially in Spain during the 16th and the 17th centuries. However in overall, all the American societies enjoyed obtaining Asian goods, which were considered to be luxurious and there is no doubt that there was a flow of Asian goods from New Spain. The major focus will be whether Spain had a similar evaluation for Asian products as Portugal or American societies owing to the scarcity of excavated Chinese ceramics. From the fact that very few Chinese ceramics are found in Spain especially in the mentioned period, the speaker wishes to question whether the Manila Galleon Trade was almost a worldwide trade that intrigued the supply of Asian products in all areas in the world or was the influence limited to Latin American society.

As a future avenue of research, excavations and Chinese ceramic finds in Northern Europe will be proposed to consider whether redistribution of Asian goods from Spain was practiced and gave an influence on some European kilns.

Key Words: Manila Galleon, China, ceramics, Mexico.
Manila Galleon Trade created an important and long route between Asia and America. Not only economical exchanges were carried out but cultural exchanges, migration, and product exchanges were carried out through this trade.

Ceramic exportation was one of the important exchanges in the Manila Galleon Trade especially the Chinese ceramics, which were almost a worldwide product.

In this session, the speaker will analyze the wide distribution of Chinese ceramics related to Manila Galleon Trade especially Macao, Mexico, Lima and Spain. Both continuity and discontinuity can be observed among the excavated Chinese ceramics especially in Spain during the 16th and the 17th centuries. However in overall, all the American societies enjoyed obtaining Asian goods, which were considered to be luxurious and there is no doubt that there was a flow of Asian goods from New Spain. The major focus will be whether Spain had a similar evaluation for Asian products as Portugal or American societies owing to the scarcity of excavated Chinese ceramics. This is to question whether the Manila Galleon Trade intrigued a worldwide trade and flow of goods all over the world.

As a future research, excavations and Chinese ceramic finds in Northern Europe will be proposed to consider whether redistribution of Asian goods from

The Galleon Trade was a trade between Manila and Acapulco, the longest maritime trade route in the history. However, when we closely see the whole aspect of this trade especially through ceramics with its spatial
distribution, it is a complicated trade with complex trade network spread in both ends.

Manila had a frequent trade with Macao depending on Portuguese trade network in Asia. Though Manila intended to practice trade when Miguel Lopez de Legazpi, it was difficult for the Spaniards in Cebu to establish and enter in the Asian trade network. Trade between Macao and Manila probably established in a very early phase of the Spanish conquest of the Philippines.

Chinese ceramics are found from the Monte Fortes site, when the excavation was carried out to construct Macao Art Museum, and also some surface finds from the San Augustine convent site.

The earliest piece that was found in Macao was the plum tree design plate in the centre with flat rim, which should fall into the mid 16th century. This plate can be found in some museum collections in Lisbon, which is considered to be the popular piece when the Portuguese began to import Chinese ceramics in large quantity. On the other hand, this type cannot be found in Mexico or other market such as Nagasaki. In other words, this type of dish was the earliest type, which was exported to the west. Large plates were not for an Asian gastronomy but traditionally for Middle Eastern to western culture. Flat plate with rim was obviously for European food culture to place culinaries. This was probably consumed among the high social class in Portugal at the time where people appreciated Chinese porcelains. Another type found in Macao was a large plate with vegetal design in the middle encircled by the sequence of ruyi heads (see Figs. 1 and 2). This type also dates to the mid 16th century, which can be found among the ceramics excavated in Mexico which are considered to be the earliest type exported from Manila. They are also present among the heirloom pieces in Portugal in Museu Medeiro Almeida and from the
excavation of Casa de Quadro y Bodega en Lima. The fact that these were found in Macao, Lisbon, and Mexico shows that Macao and Manila was definitely linked in trade and the Portuguese were the intermediaries to supply Chinese porcelains to send to New Spain especially in the early phase of Manila Galleon Trade. Jingdezhen was of course the world largest ceramic production site and the Anhui merchants were active performing as intermediaries between Jingdezhen and the Portuguese merchants.

The Spaniards were still based in Cebu during the 1560s and Miguel Lopez de Legazpi was sending a letter to the king describing the poor situation of the Spaniards in Cebu without ships, soldiers, munitions and thus were not able to get in touch with the Chinese, who come to Luzon Island to trade. Therefore, it is very likely that the Spaniards were buying Chinese and Southeast Asian products from the Portuguese, who had several decades of experience in the trade in Asia. Moreover, these early Manila Galleon pieces were already bought by the Peruvian merchants, who came to Acapulco.
The ceramics found in Lima are concentrated in mid 16th century to the end of the century although late pieces are also found.

Other ceramic type such as landscape design on the centre and wide flat rim dated to 1575 until the end of the 16th century can be found from various sites such as Monte Fortes, Zocalo (Mexico City), Nagasaki, Lisbon, and Drakes Bay. The pieces found in Drakes Bay were to be distributed in Latin America. The piece found in Nagasaki indicates that the city and the port, which was originally constructed to let the Portuguese ships come in was in the Southeast Asian and East Asian commercial network before closing the country. Japan had a strong connection with Macao in terms of Jesuits’ commercial activity trading Chinese silk with Japanese silver. However, the archives in Archivo de Indias in Spain shows that the Sangleys (Chinese in the Philippines) were sending ships to Japan especially during the 1590s. This means that Nagasaki was
linked to Manila Galleon Trade until the early 17th century, which matches with the history of Japan’s closure.

Another type of ceramic dated to third quarter of 16th century to late 16th century is the plate with phoenix in the centre and six Taoist symbol on the flat rim (see Fig. 3).

![Fig. 3: Blue and White Jingdezhen Phoenix plate from Zocalo.](image)

This type is found in Indonesia, Malaysia, Nagasaki, Macao, Lisbon, Mexico, Drake’s Bay, Lima, Seville and Santiago de Compostela. This type seems to be found in many areas with abundance, which means that this was a popular type of the time. The importance of this type is that this is found from Asian port polities to the Spanish territory and indicates that some of the Chinese ceramics were transported to Spain from Veracruz. It also signifies that the commerce in Asia and the trade crossing the Pacific and Atlantic became a regular flow of goods.
Kraak porcelain, which has eight to ten panels dividing the plate wall with floral designs and dots, are typical to the 1600s until the 1640s. This type was produced and distributed in large quantity. It is found in almost all the important ports of the time although it is absent from Seville and other port cities in Spain save Santiago de Compostela, which is not a port city but a religious and academic city in Galicia, northern Spain. Kraak types are completely absent from the Galician coastal area such as Pontevedra, Vigo, Bayona. Considering the character of the city of Santiago de Compostela, where the wealth in Galicia was concentrated and was fairly well communicated with the other area owing to the pilgrimage, the Kraak porcelains could have entered to this city from other European cities such as Amsterdam (Miyata 2017). In any case, the fact that there are no Kraak wares found from the excavation sites in Seville which was the major entering port form Latin America shows that there was no demand of this popular type in Spain. On the other hand, Kraak types are found from Indonesia, Manila, Nagasaki, Sakai, Macao, Mexico, Lima and possibly more.

The first half of the 17th century consumed a large quantity of Kraak porcelain in many places. The indigenous culture of Latin America received a great influence of Kraak wares and so did the other European wares such as Lisboetan ceramics and Delft wares.

Towards the mid 17th century, exported Chinese wares in general decreased in many consumption sites although there are variations of so called “Transitional wares” especially exported to Holland. Rollwagon, large vase were types that were used to decorate houses of the middle to high class of the Dutch society. After the mass exportation of Chinese porcelains to Europe, which began in the early 16th century by the Portuguese, by the first half of the 17th century, Chinese porcelain was no
longer a luxury objects which was only for nobles and high social class but became art pieces for the middle class. These were kept in their houses. This might be one of the reason that excavated pieces are not found in Europe from this period although in other areas such as Latin America and Asia have less pieces compared to the prior period. This owes to many elements in various places but especially in China when the Qing dynasty took over the Ming dynasty and had to confront with the rebellion; Koxinga’s strong hold over Formosa which gave an influence to Manila in some way, the political tension between Portuguese and Spanish crown, which officially influenced over Macao-Manila direct trade and many ships had to go to Macassar and than reach Manila instead. The collapse of converso’s universal commercial ties with the 1640s Inquisition in Mexico may have broken the link between Latin America and Europe. All these are historical hypothesis, which need to be studied more in depth. However, it is true that during the Late Ming and early Qing, only 20% of the kilns in Jingdezhen were in operation (Sakuma, 1999). But the critical point is that the decrease of Chinese porcelain export in the mid 17th century, are possibly related to all these wide spread areas.

After the decrease of the Chinese ceramic export, the trade recovers in the 1690s. From the numerous pieces from the Vun Thau cargo, it is clear that Jingdezhen production was back in operation and even developed in variation of design and shapes. Chocolate cups began to be produced from 1680s to 90s. Cups with handle with saucer were produced around 1680s as well.

Almost all of the chocolate cups were for the Latin American market where chocolates were drunk as a habit. Tea cups with saucers were for the English, Dutch, French and some other European markets. Some
chocolate cups did reach to Iberian Peninsula, though very few of this type is found from the excavated sites and heirloom pieces.

After the recession of the mid 17th century, there was a big change in ceramic trade. Fujian, especially Dehua wares began to export blue and white wares to all the other places. Ceramic from Fujian were always minor except in Southeast Asia, they were used as daily wares. Dehua wares began to produce blue and white chocolate cups, small bowls and plates. These are apparent in Nagasaki, Macao, and Mexico. Dehua animal figures, guanyin were exported the many other places including Europe.

This rise of Dehua pieces are due to the rise of Fujianese merchants. Manila was more tied to Fujian then ever and the commercial power was in hands of Fujianese merchants. This can be substantiated by the excavated pieces in Nagasaki in the late 17th and 18th century. The China town in Nagasaki was full of Fujianese merchants and the excavated pieces are more concentrated in not only Dehua wares but Fujianese wares in general which was not the case before. The export of Chinese spoons were also from Dehua kilns and were distributed in Southeast Asian port polities, Nagasaki and Mexico. These were invention of Chinese and in the prior period, spoons were possibly metals or not in use. For example, in Japanese gastronomy, Chinese spoons were never in use until very recently with the introduction of Chinese noodles. It is unclear how these spoons were used in Mexico, with a different gastronomy. In Europe, spoons were already in use in everyday life but of wood or metal. Hence, ceramic spoons were never imported nor used.

Why the Fujianese merchants began to gain its power in the international market is unknown. Nor how the Dehua wares entered in the market is also a mystery. The price may have been modest compared to the
Jingdezhen pieces though the qualities of two kilns are incomparable. However, in Europe, Guanzai, which are produced in Jingdezhen and painted in Guangdong are more popular than Fujian wares. Dehua wares are present in some collections of the nobles though they are limited to figurines.

Henceforth we see the whole commercial network from Asia to Europe though how was the consumption and acceptance of Asian goods in Iberian peninsular? We know that porcelains, furniture and other Asian products were highly appreciated in Portugal confirming from many collections in museums and a large quantity of ceramics excavated from Alfama. From Chinese ceramics are found in abundance from Alfama, the historical part of Lisbon. The earliest pieces are found from this area which is close to the port dating to the early 16th century (see Fig. 4). These were probably traded in Goa or Malacca in the first decade of the 16th century. A blue and white plate with Qilin drawn on the centre and flat rim can be found from the Philippines,
Japan and other Asian sites. There is no doubt that the Portuguese bought these pieces somewhere in Asia before its official settlement in Macao. Most of the ceramics found from Alfama site dates within the first half of the 16\textsuperscript{th} century and the core part of the excavated pieces is from the early 16\textsuperscript{th} century. It is also noteworthy that many of the important collections are from the mid 16\textsuperscript{th} century. There are some early 17\textsuperscript{th} century collections such as Nossa Senhoras dos Mártires, which sunk in 1608 with many blue and white Jingdezhen ceramics. However in Portugal, there is a recession period in the mid 17\textsuperscript{th} century and lack of Chinese ceramics from this period can be observed. The tendency of the chronology is very similar to that of Mexico and the ceramics began to be exported again from the 1690s. 18\textsuperscript{th} century ceramics are abundantly found among the heirloom pieces in Portugal especially the Guanzai ceramics.

In the case of Spain, as mentioned previously, Seville as the important port city during the colonial period has very few excavated Chinese
ceramics in overall. There were only 38 pieces found from the excavated site of the last two decades (Miyata 2017). Kraak porcelains, which were abundant in Mexico City could not be found from this city.

In any case, Seville as one of the richest port city bringing products and silver from Latin America was also the entrance of Asian luxury goods via New Spain. However, even from the archives, it is clear that Chinese porcelains, which entered to Spain from Veracruz were very few. Silk trade was more active between Seville and Veracruz, Therefore, certainly there was a link between Manila Galleon Trade (or Pacific route) and the Atlantic trade. However, in terms of ceramics, it is likely that silverwares were much more appreciated in the Spanish society as can be observed from the list of personal property of Sevillan citizens (Aguado de los Reyes 1994) than Chinese porcelain in the Spanish society and hence they were not imported via Veracruz in abundance such as the case in Portugal. The first mass entrance of Chinese porcelain in Europe was Lisbon from the fact that there are many pieces excavated from the early 16th century. Then, they were exported further north along the Atlantic coast until they reached the Lowlands. Holland became the next distributor of Chinese ceramics in the 17th century Europe and possibly 18th century until England took its place.

Manila Galleon Trade created many commercial network on the Asian side as well as the Atlantic and Carribean side and intrigued the flow of Asian goods to all over the world. Flow of Asian products were not strongly connected between Spain and Manila Galleon Trade. On the other side, Manila Galleon Trade distributed Asian products especially silk and porcelains all over Latin America. The short distance trade in the Carribean Sea, Acapulco and Callao (Lima) trade distributed Asian goods.
However, between Veracruz and Spain, there was less commerce of Asian products compared to silver, dye materials and hides. This owes to the abundant flow of silver into Spanish society and considering silk, the protection of Andalucian silk in the Spanish market may have influenced greatly. Though there were some Asian goods entering into Spain such as folding screens and lacquer wares. These were probably bought in Nagasaki by the Chinese and Portuguese merchants (in case of Portuguese merchants, they were only allowed to practice trade until 1630s) and was brought by the Manila Galleon Trade and then to Spain. Therefore, Spain was not completely disconnected from the Manila Galleon Trade though the roll of the Pacific trade was not significant.

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Biography

Etsuko Miyata

Archaeological explorations on the San Francisco (1609) sunken off the coast of Chiba Prefecture

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Abstract

This paper will present the intermediate result of archaeological search of the San Francisco, sank off the coast of modern Onjuku in Chiba Prefecture, Japan. The San Francisco was one of the three galleons left the port of Manila in July 1609 and attempted to pick up the Kuroshio Current on the return voyage to Acapulco. As typhoons and storms were part of the galleon shipping experience, the ships were dispersed by strong gale. While the fate of the other ships was less tragic - the Santa Ana drifted to Nakatsuura in Usuki in modern Oita and the San Antonio managed to sail back to Acapulco, the San Francisco smashed into a reef somewhere in waters near Iwawada in Onjuku in September 30 in 1609. The wrecking event of the galleon has been well-examined from a viewpoint of the Spanish-Japan history based on historical accounts left by Rodrigo de Vivero y Aberrucia who was on board to back to Mexico after serving one year in the Philippines as a governor (Capitiania general de Filipinas).

However, limited archaeological studies have been conducted on the historical incident, and so far none of artefacts related to the San Francisco have been ever found. The underwater search by using remote sensing survey equipment and diving inspections were conducted in 2016 with the support of KAKENHI. The aim of the investigations is to assess the archaeological potential of the area. The current project scheme includes the identification of the area where the wrecking event occurred. The project also intends to clarify the archaeological understanding of the San Francisco, such as the construction place of the ship and shipbuilding industries in the seventeenth century in the Philippines.

Key words: Spanish Galleon, Japan, survey, ship construction, Philippines
Introduction

In recent times, the archaeological interest in Galleon trading in the Asian and Pacific regions has grown (Wu 2016). The Japan Society for the Promotion of Science is supporting a 3 year research project about the Manila Galleon *San Francisco* that sank in Japanese waters. This paper describes the outline of the project whose aim is to conduct an archaeological search for the *San Francisco*. The *San Francisco*, a Manila-Acapulco bound galleon, sank in 1609 somewhere near modern Onjuku town in Chiba Prefecture (Fig.1). It is said that more than fifty people died but about three-hundred sailors and passengers managed to reach the shore and were rescued by people from Iwawada village. The historical importance of the wrecking event has been well-recognized, and a series of important diplomatic exchanges consequently occurred between the rulers of the two countries - Ieyasu Tokugawa of Japan and Felipe III of Spain. Historical accounts associated to the wrecking event have been translated and studied by scholars in Japan and Spain (Gil 1991, Uchmany 1993, Murakami 1966). Even though quite a few historical records are available, almost no archaeological material evidence of the wreck has been found and although the survivors’ landing place has been identified, the historical descriptions do not seem to match the designated site. The maritime archaeological project is using remote sensing surveys of the seabed to help identify where the wreck might be.
Historical backgrounds and importance of the *San Francisco*

The first European study of the Manila Galleons was by William Lytle Schurz. (Schurz 1939), He focused on what he saw as the positive commercial activities of the Spanish and their relations with other Asian countries. Recent studies have focused more on the ocean environments and their impacts on the voyage of the Spanish Galleons, as the substantial losses occurred due to storms and typhoons (Warren 2012). The return trip to Acapulco, via the Kuroshio Current, was particularly hazardous due to the summer monsoons. The Manila-Acapulco bound galleons usually headed north just before the start of the typhoon season to catch up the southern monsoon winds and Kuroshio current. It was a long trip and the weather was quite unpredictable. The first record of a Manila Galleon wrecking on the Japanese was the *San Felipe*, which left Manila in the mid-July in and wrecked near Tosa (modern Kochi) about two month later. The incident is well documented, including the breaking up of the vessel under the orders of Toyotomi Hideyoshi and the confiscation of the cargo. This coincided with a turbulent period in
Japanese history with the incursion of Christianity into Japan and this incident revived Hideyoshi’s antipathy towards the religion. Ieyasu Tokugawa, who united Japan in 1600, showed a more tolerant policy towards foreigners who accidentally wrecked on the Japanese coast. In 1600 the storm damaged Dutch ship Liefde limped into Usuki Bay after an unpleasant long voyage across the Pacific. One of the twenty four survivors, the English sailor William Adams, was later was appointed to an advisory position to Leyasu Tokugawa (Boxer 1963). What Adams achieved during his appointment includes the construction of European style sailing ships ordered by Iyeyasu Tokugawa. They were the first western style wooden ship ever constructed in Japan. One of them was used for the Spanish survivors of the San Francisco to return to Acapulco by crossing the Pacific.

The voyage of the San Francisco seems to have had a number of incidents including hitting a reef sustaining damage that may well have been a factor in its subsequent sinking. On board were more than three-hundred crew and passengers including Rodrigo de Vivero y Aberrucia, who had served as a former governor of the Philippines. Vivero’s account of the wrecking in Relación y noticia del Reino del Japón is an important source of information about the event and the fair treatment of the survivors by the Japanese (Gil 1991). The construction of records of the San Francisco has not been found yet. In the sixteenth and seventeenth centuries, Cavite was a major shipyard at the time in the Philippines (Fish 2011). The local shipbuilders constructed various types of ships which ranged in size from 300 to 1,000 tonnage (Junco 2016). The San Francisco was a 1,000 tonnage galleon, according to Viveros’ account, and this represents the cargo capacity of the vessel. The limited evidence available indicates that the hull was well-built but the ship had a problem
with its rudder that caused some difficulties with its steering. The copies
of the Vivero’s account are archived in Archivo Histórico Nacional (Real
Academia de la Historia) in Madrid and the British Museum in London.
Both copies have been studied by many scholars, particular focus on
details about his stay in Japan and its impact on the diplomatic
relationship between Japan and Spain (Gil 1991, Murakami 1966). The
first part of the account recounts the hazardous voyage of the San
Francesco:

“... El año de 1608, a 30 de septiembre, día del Glorioso San
Jerónimo, se perdió la nao San Francisco, en la que yo salí de las
Filipinas, habiendo servido allí a Su. Magestad. en el Gobierno de
ellas. Y aunque las tormentas y naufragios que hasta este punto
se padecieron eran copiosas para hacer una larga relación, y no
sé si en sesenta y cinco días que duró la navegación, hasta que
llegó esta desdichada hora, se han pasado en la Mar del Norte ni
en la del Sur, mayores desventuras. El fin de ellas y principio de
otras fue hacerse pedazos la nao en unos arrecifes en la cabeza
del Japón en treinta y cinco grados y medio de altura, con yerro
de tan gran perjuicio en todas las cartas de marear, por donde
hasta allí se había navegado, que pintaban esta cabeza del Japón
en treinta y tres grados y medio. En suma, por esta razón o por la
original y verdadera, que fue cumpliese la voluntad de Dios, se
perdió este galeón con dos millones de hacienda. Y desde las diez
de la noche que varó en tierra hasta otro día después de
amanecido media hora, todos los que escapamos estuvimos
colgados de las jarcias y cuerdas, porque la nao se fue partiendo
en pedazos, y el más animoso expresaba por credos su fin, como
se les iba llegando a cincuenta personas que se ahogaron,
sacadas de los golpes y olas de la mar. De entre los demás que
nos libramos con tan gran misericordía de Dios, saliendo unos en
maderos, otros en tablas, y los que quedaron últimamente en un
pedazo de la popa, que fue el más fuerte y por más rico alguno,
entre muchos, que sacó camisa. No sabiendo nadie si era isla
despoblada o en qué paraje nos caía, porque los pilotos decían
que, según la altura no podía ser del Japón, mandé a dos
marineros que subieran arriba y descubriesen algo de la tierra, y
al poco rato volvieron pidiéndome albricias de que había sembrados de arroz. Pero caso que esto aseguraba la comida, no las vidas de los que allá íbamos sin armas ni defensa humana, si por desgracia la gente de la isla no fuera la que fue, que dentro de un cuarto de hora, parecieron japones. Nueva de sumo gusto y alegría universal, pero particularmente para mí, porque siendo Gobernador de Filipinas y hallando que la Real Audiencia que antes de mi llegada gobernaba, tenía presos doscientos japones con causa que debían de justificarse cuando se prendieron. Pero a la sazón tenía razones favorables de parte de ellos, con que me determiné, no sólo a sacarlos de la cárcel, pero a darles embarcación y pasaje seguro para su tierra, de que el Emperador se me había mostrado notablemente agradecido. Hice seguro juicio de que no olvidaría esto y siempre tuve las esforzadas esperanzas de su gratitud, que después vi cumplida. Llegaron cinco o seis japones, de los que digo, a nosotros, lastimándose por palabras y demostraciones mucho de vernos así. Y mediante un japón, christiano, que se perdió conmigo, yo les pregunté dónde estábamos, y ellos en breves razones respondieron que en el Japón, y en un pueblo suyo llamado Yubanda…”

Based on the existing study on the above text as well as Vivero’s another account in chapter forty-four in the Abisos y proyectos para el buen gobierno de la monarch, the voyage and wrecking of the San Francisco can be summarized as follows: The galleon fleet was commandeered by Juan de Ezquerra who was already over 70 years old and not far from retirement. The fleet, consisting of the Almiranta San Antonio, Santa Ana and the San Francisco set sail from Cavite July 25 of 1609. All three ships encountered storms around the islands of Los Ladrones (the Northern Mariana Islands) in August 10, and only the San Antonio was able to complete the voyage and reach Acapulco. The Santa Ana managed to arrive Bungo (Oita) but was almost entirely destroyed. Vivero emphasized the fact that the storm, which occurred during the sixty-five days’ voyage after the ship left Cavite, was the most powerful cyclonic storm he ever encountered. During the storm the San Francisco, under the command of
Juan Cevicos, had to cut the main mast and leaking became a serious problem, which led to the decision to try to drift to the coast of Japan. They thought that the ship was sailing northward somewhere off the southernmost end of Japan (likely modern Noshimazaki in the end of Bosho Peninsula in Chiba). However, a miscalculation of the latitude got the actual position of the ship at least further one degree north around 33.5N. Around 10 o’clock in the evening on September 30 of 1609 the ship struck a reef about two leagues from the shore near Yubanda (Iwawada in Onjuku town in Chiba) and the hull was broken up. Fortunately, quite a few people survived with wreckage. Although 56 people drowned, some could swim whilst others clung onto floating timbers, and a few were on the remaining part of the stern of the San Francisco. By the morning the survivors had managed to get to land but thought they had landed an inhabited island rather than the mainland of Japan. A few sailors shortly found rice paddy fields not far inland, six local people appeared. They told the survivors that they were from a village of Yubanda located about one and half a league away. The survivors of the San Francisco were then taken to the village. It did not take long for Vivero to be recognized as an ex-Capitania general de Filipinas, and later was granted an audience with Ieyadu Tokugawa. This meeting followed their previous written exchanges during the two years’ Vivero was Governor of the Philippines. During their meeting in Japan there were diplomatic negotiations which established a new trading relationship between Spain and Japan. Lyeyasu Tokugawa let them use the William Adams’s ship, renamed the San Buenaventura, to sail back to Spain. After almost one year Vivero left Japan on 1 August 1610 and anchored at Acapulco on November 13 in 1610.
Impacts of the wreck event and material evidence

The unexpected loss of the *San Francisco* led to the successful voyage of the *San Buenaventura* back to Spain. The ship is recognized as the first Japanese built vessel ever to cross the Pacific Ocean. Onboard were twenty-three Japanese who were officially the first Japanese to arrive in America. While the ultimate fate of the *San Buenaventura* is not entirely known, it was to be used for the return voyage to Japan of a Spanish delegation commanded by Sebastián Vizcaíno, who was to investigate the commercial prospects of silver mines in Japan. However the *San Buenaventura* made the westbound trip to Cavite and as a result, crossed the Pacific twice. The further records of the “*San Buenaventura*” is worth being pursued in future.

In 1611, the Viceroy of Mexico sent Sebastián Vizcaíno to Japan. At a meeting with Leyasu Tokugawa, Vizcaíno brought a number of gifts from Felipe III of Spain, which are now in the museum of Mt. Kuno Toshogu. The Kunosan Toshogu was dedicated for the worship of Ieyasu Tokugawa. One gift was a clock, which is still in the museum collection (Fig.2). It is important as a cultural and historical asset as the oldest Western clock in Japan. The internal mechanism remains the most intact among clocks from the seventeenth century.

*Fig.2: Clock of Ieyasu. Courtesy of Mt. Kuno Toshogu*
Despite the fact that the records about the loss of the *San Francisco* have been well-examined and the impacts of the sunken ship have been evaluated, the archaeological evidence of the shipwreck is extremely limited. Vivero’s historical accounts illustrate that some of the cargo of the *San Francisco*, such as textiles and bees wax, reached the shore and the local villagers pillaged the cargo that washed ashore. Any remains of the cargo no longer exist in Iwawada in modern Onjuku town. An initial investigation to attempt to identify possible salvaged cargo in Onjuku took place in the nineteenth century, Meiji Period. Then, it was reported that, apart from an unknown metal pot and ceramics, no artefacts were found in the town.

In 2006, the author inspected roof beams inside one of the oldest houses in Onjuku that were said to be timbers salvaged from the wreckage that drifted to shore from the *San Francisco*. No clear evidence was noted in relation to such provenance. The wood species identification on a specimen cut from one of the beams shows the wood is a Japanese native species (Kimura and Sasaki 2006). In 2009 as part of the 400th anniversary of the rescue of the crew of the *San Francisco*, the municipal office of Onjuku investigated whether any artefacts of the ship were still possessed by residents in the town. However, nothing was found. Today in Onjuku the local people still appreciate the connections to the historic shipwreck, which is shown in the erection of the Mexico and Spanish Commemorative Tower in town. Modern Tajiri beach is said to have been the landing place of the survivors, which is now a designated historic site.

**Archaeological search of the *San Francisco***
In 2016, a maritime archaeological project began with an aim of locating the exact position of the *San Francisco* and evaluating any material evidence on the shore and underwater around Onjuku. The underwater archaeological investigation includes remote sensing surveys and diving searches with a metal detector specifically trying to locate any metal artifacts from the shipwreck. There are no records about any salvage of large metal objects of the shipwreck, such as anchors or cannon. The bronze cannons and iron anchors found on the wreck of the *San Diego* (1600) in the Philippines and at the *Nuestra Señora de la Concepción* (1638) in Saipan show the potential for survival of the ferrous and other metal objects on Manila galleons. Considering these examples in the case of the San Francisco there is possibility that the corroded objects might remain on the in situ on the seabed. The preservation condition of such artefacts is also related to the sediment condition of the seabed. The existing study of the seabed sediment analysis suggests that the offshore
Tajiri, the proposed landing place of the survivors, is composed of rocky bed, while the sand sediments of the modern Onjuku beach extends to the well offshore (Fig.3). The seabed of off Onjuku is exposed to high energy from swells and waves as seen along the coastal cliffs that extend northwards from the beach to Tajiri (Fig.4).

*Fig.4: Tajiri beach is said to be the landing place of the survivors of the San Francisco.*

The study area for underwater archaeological search is based on what is written in Vivero’s historical accounts, which provide some clues as to the possible location of the San Francisco -

a). The damaged ship hit a reef and the hull collapsed and was washed away apart from a portion of the stern.

b). The wrecked position was about two leagues from the shore

c). There were more than three hundreds survivors who reached the shore due to the use of hull remains.
The proposed study area off the coast of Tajiri is a grid of 6 x 6 kilometers which covers relatively shallow waters ranging in a depth from 3 to 50 meters within 10km from the shore. Within the study area there are a few reefs sitting proud of the seabed. Two seasons of seabed topography recording with a multi-beam sonar were conducted in July 2016 and January 2017 in cooperation with the Windy Network Ltd. The survey was carried out in a total of fourteen days and recorded an area of 3.5 x 2.1 square kilometers. A multi-beam sonar Sonic 2024 of R2 Sonic with 200-400 kHz was used with D-GNSS and Hypac 2015 a real-time data recording system. All the equipment was mounted on the boat hired from the Fishery Cooperative of Iwawada. The survey system allowed us to create the DEM of seabed with 50cm grid resolution (Fig.5).

![Fig. 5: Multibeam bathymetric data of the seabed off Tajiri.](image)

A preliminarily diving and shoreline search was conducted in August 1-13th in 2016. Based on the seabed topography data from the multi-beam sonar recording, the diving search was conducted in the selected area composed of a few reefs, potentially hazardous for sailing. The low
visibility of the waters as well as the strong surface current and surge at the bottom restricted the effectiveness of the diving survey. The seabed has complex topographical features consisting of rock valleys on which a large brown kelp (*Ecklonia cava*) extensively grows. This kelp prevented us from conducting efficient circular and straight line searches. A coarse sand fills the valleys in which an underwater Minelab metal detector helped us to locate corroded ferrous objects beneath the surface of sand. Later it was identified as a metal pipe, plate and rivets associated to the British built ship *MV Rubens* that sank in the area in the 1950s.

**Intermediate result and discussions**

The seabed topography recording reveals that the coastal waters offshore from Tajiri Beach is not deeper than 10 meters. This area has been dived extensively by Ama skin divers for abalone, algae, and turban shell fish that live in the shallow rocky seabed over many centuries. During the heyday of the Ama fishing in the 1970s, more than four hundred Ama have dived in this area, and today several Ama divers are still engaged in seasonal fishing. No reliable reports about any findings of the San Francisco’s artefacts were found which included interviews with elder Ama divers, as well as with village residents.

The shallow coastal waters with rock bed ends about 1.5 kilometers off the shore and from this point the seabed shows the complicated and undulating topography with a number of gullies. The brown kelp covering the reefs and gullies and the poor visibility underwater meant just relying on a dive search to identify any cultural remains was not effective. The coastal currents and waves could push wreck material into the sandy bottom of the gullies, and this was confirmed by the buried wreckage of
the *MV Rubens* (1951). The sand sedimentation rate is relatively high at the bottom of the gullies and the fragments of the remnants of the *Rubens* was covered by about a 20cm thick through the fifty year after the wrecking. The thickness and profile of the sand sediments has not been examined yet, but if there are any remnants of the *San Francisco* in the gullies, they could be buried in the coarse sand more than 30cm deep. A marine magnetometer survey would need to be conducted in order to identify the location of the buried material and the resultant data would need to be evaluated with the multi-beam sonar data. Then there would need to be an underwater survey conducted by diving on any anomalies detected by the magnetometer survey.

**Conclusion**

The underwater archaeological research of the Manila Galleon *San Francisco* aims to answer a query as to why no physical material of the shipwreck and cargo has survived or been found considering the existence of a number of historical accounts that describe the wreck event. A relevant hypothesis has been developed that substantial wreckage could remain offshore. The evaluation of the archaeological potential is the main theme of the project. The detailed map from the multi-beam sonar survey reveals the complex topography of the seabed where it is likely the sand bottom of the rock gullies may contain the remains of the wreckage. This is an intermediate report of the survey for the next phase of the project which will focus on the detection of the ferrous and metal objects of the shipwreck.

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The trans-Pacific trade of Chinese porcelain to the Spanish colonies in the New World in the late 16th and early 17th centuries, and its impact on the local ceramic industry

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Abstract

After the discovery of the New World in 1492, the Spanish followed the Portuguese in the overseas expansion to Asia. The founding of Manila in the Philippines in 1571 gave the Spanish a foothold in the profitable existing Asian trade network, and the ability to acquire valuable goods from Chinese, Japanese and Muslim merchants who came there to trade. Large quantities of Chinese porcelain (as well as silk) were shipped from Manila via the trans-Pacific trade route of the so-called Manila galleon to the Spanish colonial viceroyalty of New Spain in the New World in the late 16th and early 17th centuries.

Based on an interdisciplinary study, this paper presents textual and material sources that illustrate the variety of Chinese porcelains imported into New Spain during this period, and the different ways in which they were distributed within the viceroyalty and to that of Peru, and how they came to be integrated into the everyday life and households of a clientele of nearly all social classes and had a distinct function as markers of wealth and social status.

Archaeological evidence yielded from Spanish datable shipwrecks as well as Chinese porcelain shards found at native village sites of Alta California, and those recovered from excavations at Spanish settlements in both New Spain and Peru, are discussed along with an apparently unique armorial porcelain that was specially commissioned for the 8th viceroy of Peru in the late 16th century. This paper also discusses the profound and lasting impact that the imported porcelain, especially a mass-produced type known as Kraak, had on the local ceramic industry, which responded rapidly to the new demand for majolica (tin-glazed earthenware) imitations once its production in China, came to a halt. These porcelains and majolica imitations not only bear testimony to the cross-cultural exchange that occurred between Spain and China, but also demonstrate the fascination that Kraak porcelain exerted on the Spanish colonial societies.
in the New World at the time.

**Key words:** Chinese porcelain, Spanish Galleons, blue-and-white, Kraak

**Trade to the Viceroyalty of New Spain**

The Spanish, through their trans-Pacific trade route established in 1565 after discovering a feasible eastward route to Acapulco on the west coast of New Spain, appear to have been the first Europeans to import Chinese porcelain\(^1\) into the New World. Large quantities were shipped annually from Manila in the so-called Manila galleon – known in Spanish as *Nao de China* or *Nao de Acapulco* – to Acapulco in the late 16\(^{th}\) and early 17\(^{th}\) centuries. This Manila-Acapulco route connected regularly New Spain with China, not only economically, but also culturally. New Spain’s location, at the crossroads of both trans-Pacific and trans-Atlantic trade routes, facilitated the trade and circulation of porcelain and other Asian goods within the colony and to that of Peru, and in lesser quantity, also to the colonies in the Caribbean and the motherland, Spain.\(^2\)

After silk, porcelain was the second most important trade good imported into New Spain. Textual sources indicate that porcelain was imported from the early years of Spanish presence in the Philippines, first by the galleons that traversed annually from Cebú, and after 1571, from Manila. In 1568, an eastbound galleon that shipwrecked in the islands of Guam, was carrying ‘[As] a sample … silk and porcelain and other curious products to content … the vassals of Your Majesty’.\(^3\) Two years later, the galleon *Espíritu Santo* left Cebú with a cargo of two porcelain jars for two Portuguese named Domingo and Lucas, ‘porcelains, porcelain jars with less value … twelve packages of porcelain, six pieces of porcelain, 300 large pieces of porcelain, jars’ for the Portuguese Jiménez Barbero, and another ‘700 pieces of porcelain’ for another Portuguese, named Felipe. In 1572, the *Santiago* left Manila with ‘400 pieces of porcelain’, which
belonged to a merchant named Julian de Arbolancha. Although the types of porcelain are not specified, it is clear from these extracts that the porcelains were imported as private consignments for a number of different Spanish merchants or private individuals, as well as for Portuguese merchants, some of them wealthy New Christians. By 1573, the amount of porcelain imported had increased exponentially. That year two eastbound Manila galleons carried 22,300 pieces of ‘fine gilt china, and other porcelain ware’ to Acapulco.

The textual sources discussed thus far suggest that early cargoes of the Manila galleons included some porcelains ‘as samples’, which not only were of differing quality but also may have originated from multiple production centres and workshops in China, most probably reflecting a period of experimentation of both the Chinese junk traders and the Spanish to assess the requirements of the new consumers in New Spain and Peru. The sixteen hundred porcelains (two intact bowls and all the others fragments or shards) that have been found on the coast of Baja California, where the galleon now known as the Baja California shipwrecked in the late 1570s, support this theory and give us an indication of the diverse variety imported. The cargo included a full range of fine, intermediate and coarse porcelain of various shapes and designs from the private kilns of Jingdezhen in Jiangxi province – the largest and most important kiln complex in China – and the kilns of Zhangzhou in the southern coastal province of Fujian. The finds consist mostly of Jingdezhen trade porcelain decorated in underglaze blue and include only a few pieces of kraak porcelain, and numerous pieces decorated in overglaze polychrome enamels, including a small number of the kinrande type with additional gold decoration. They formed part of bowls, plates, cups, jars, covered bowls and bottles, while the Zhangzhou porcelain
formed part of dishes and jars. Jingdezhen trade blue-and-white, Kraak and Zhangzhou porcelain were also part of the cargo of three Manila galleons that shipwrecked at turn of the century: the San Agustín, which sank in 1595 in Drake’s Bay, Alta California; the San Diego, which sank in 1600 off Fortune Island; and the Santa Margarita, which sank in 1601 near the island of Rota.

The survivors of the San Agustín, after having interacted for over a month with the indigenous Coast Miwok tribe (inhabitants of present-day coastal Marin County), abandoned the galleon and its cargo and sailed to Mexico in a small boat. The origin of a large quantity of porcelain shards, mostly blue-and-white from Jingdezhen, found at Tamal village sites in Drakes Bay has been much debated. They formed part of a variety of high-quality kraak porcelains (Figs. 1 and 2) and of trade blue-and-white porcelains (Fig. 3). In addition, many shards of the coarser Zhangzhou blue-and-white porcelain were found (Fig. 4). Some authors believe that all the porcelains, whether showing signs of water and sand abrasion or not, were those carried by the San Agustín. Others postulate that the non-waterworn shards come from porcelain abandoned or given to the Coast Miwok tribe by the English privateer Sir Francis Drake sixteenth years earlier, in 1579, when he stopped in this area for 36 days while his ship the Golden Hind, was being repaired for the return voyage to England. If Drake left some porcelain behind or gave it to the Coast Miwok tribe, it would most likely have been loot from a Spanish galleon. From a letter sent by Francisco de Zarate to Martin Henriquez, the viceroy of New Spain, were learn that when his ship was seized by Drake on April 4 of that year off the coast of Guatemala, he took little of what belonged to him, which included ‘certain trifles’ that had ‘taken his fancy’ for his wife.
Zarate’s ship is said to have been laden with ‘cheaks full of fine earthen dishes, very finely wrought, of fine white erth, brought by the Spanyards from the country of Chyna which dishes the Spanyards greatly esteem. Of these dishes Drake tooke four chests full from them’.  

Fig. 1 (left): Fragment of a kraak dish excavated at a Tamal village, Drake’s Bay. Jingdezhen kilns, Jiangxi province Ming dynasty, Wanli reign (1573-1620)  
Point Reyes National Seashore Museum

Fig. 2 (right): Fragment of a kraak bowl excavated at a Tamal village, Drake’s Bay. Jingdezhen kilns, Jiangxi province Ming dynasty, Wanli reign (1573-1620)  
Point Reyes National Seashore Museum

Fig. 3 (left): Fragment of a trade blue-and-white plate excavated at a Tamal village, Drake’s Bay. Jingdezhen kilns, Jiangxi province Ming dynasty, Wanli reign (1573-1620)  
Point Reyes National Seashore Museum
Fig. 4 (right): Fragment of a Zhangzhou dish excavated at a Tamal village, Drake’s Bay. Zhangzhou kilns, Fujian province Ming dynasty, Wanli reign (1573-1620)
Point Reyes National Seashore Museum

The cargo of the *San Diego* is well documented, and yielded more than 500 intact pieces or fragments of blue-and-white porcelain. Most of them are *kraak* (Fig. 5), including a variety of closed shapes: covered boxes, pear-shaped bottles, jars, pomegranate-shaped ewers and globular or elephant-shaped *kendis* (Fig. 6). There is also a considerable quantity of Zhangzhou blue-and-white porcelain, among which are some pieces modelled after Western shapes (Fig. 7). Only one plate, a box and a bowl recovered from the shipwreck show traces of overglaze enamel decoration. The bowl shows parts of the outline of two dragons in underglaze blue, and thus can be identified as *wucai* porcelain.
Fig. 5: Kraak plates from the shipwreck San Diego (1600). Jingdezhen kilns, Jiangxi province
Ming dynasty, Wanli reign (1573-1620)
© Franck Goddio, Institut Européen d’Archéologie Sous-Marine (IEASM)

Fig. 6: Kraak elephant-shaped kendi from the shipwreck San Diego (1600).
Jingdezhen kilns, Jiangxi province
Ming dynasty, Wanli reign (1573-1620)
© Franck Goddio, Institut Européen d’Archéologie Sous-Marine (IEASM)
The *Santa Margarita*, which shipwrecked after having docked alongside the *San Diego* in Manila, yielded a few intact *kraak* dishes and plates, and thousands of shards of dishes, plates, pear-shaped bottles, small bowls and covered boxes (Fig. 8). A comparative analysis has shown that many of these pieces or shards are almost identical to those recovered from the *San Diego* suggest that the porcelain was probably purchased from the same Chinese junk and/or Portuguese ship that came to trade in Manila.

The cargo yielded from the Manila galleon *Nuestra Señora de la Concepción*, which sank off the Mariana Islands in 1638, shows that by the third decade of the 17th century the imports into New Spain included both *kraak* and the so-called Transitional style porcelain from Jingdezhen. Although no intact pieces were recovered, it was possible to conclude that over half of the porcelain was *kraak*, which mostly formed part of dishes...
and bowls. She was carrying a mixed cargo, as was common at the time, which also included some Zhangzhou blue-and-white dishes.\textsuperscript{13}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure8.png}
\caption{Kraak porcelain from the shipwreck Santa Margarita (1601). Jingdezhen kilns, Jiangxi province. Ming dynasty, Wanli reign (1573-1620). © Jack Harbeston, IOTA Partners}
\end{figure}

The Manila galleons – at first between one and four sailing each year but after 1593 a decree limited the number to two, and subsequently to only one – were overloaded with registered cargo as well as contraband, filling every empty space. The porcelains imported were used as ballast cargo because of their impermeability, easy packing and storage, and heavy weight, and thus were stored in the hold of the galleon to provide stability. After the galleon reached Acapulco in November or December, the porcelains (alongside silk and other Asian goods) were sold in the \textit{Feria de Acapulco} (Acapulco Fair), a wholesale and retail fair that was held in January and lasted about one month. Merchants from all over New Spain and the viceroyalty of Peru attended. Recent archaeological finds attest to the wide variety of porcelains from Jingdezhen, Zhangzhou and Dehua imported into Acapulco in the late 16\textsuperscript{th} and early 17\textsuperscript{th} centuries.\textsuperscript{14} Most of
the porcelains, intended for consumption in New Spain, were carried inland on an arduous mule train over the mountains to the viceroyalty’s capital, Mexico City, formerly the ancient Mexico city of Tenochtitlán. There they were sold in the city market (parián) of the Plaza Mayor in present-day Zócalo area, the administrative seat of the viceregal government. The vast supply of silver after the discovery of rich mines in Zacatecas, located about 480 kilometers north west of Mexico City, and the wealth generated by it, created an unprecedented demand for the newly imported porcelain, which was made of an unknown material. Until then, although the areas colonized by the Spanish in the New World had ancient ceramic traditions, the colonial society in New Spain (with the exception of high military officials, the clergy and the viceregal administration) was accustomed to use a variety of utilitarian majolica (tin-glazed earthenware) objects in the household imported from Seville, which were not very sophisticated.

The exotic nature, beauty, translucency and durability of porcelain made it a highly desirable good and thus coveted not only by the colonial elite (both Spanish and Creoles), clergy and wealthy merchant class but also by other residents of lower socio-economic standing. Several possible reasons for this come to mind. Presumably, the most relevant are the following: porcelain was far more accessible in the New World than in Spain, and it was considerably less expensive than the majolica imported from Seville. Textual and material sources give evidence of a large-scale porcelain consumption among the multi-ethnic society of Mexico City. Inventories of the belongings of members of the Consulate, dating from 1589 to 1645, list considerable quantities of ‘loza de la China’ (pottery from China). For instance, the pieces listed in the 1645 inventory of Lope
de Osorio as ‘Ten little lions of the said pottery from China, small’ may have referred to blanc de chine Buddhist Lion incense-stick holders made at the kilns of Dehua in Fujian province similar to an example recovered from the Nuestra Señora de la Limpia y Pura Concepción, which sank while en route from New Spain to Spain in 1641 (Fig. 9).\textsuperscript{17} Interestingly, some textual sources have shown that the middle elites acquired more pieces of porcelain than the wealthiest elites of the capital. This may be due to the tastes of the latter, who, like the members of the royal court and nobility in Spain, preferred to acquire tableware made of silver rather than of porcelain.\textsuperscript{18} In any event, porcelain was integrated into the daily lives of the upper classes as objects of household consumption, both displayed and used in gatherings to eat and drink, and other cultural practices.\textsuperscript{19}

Fig. 9: Blanc de chine Buddhist Lion incense-stick holder from the shipwreck Nuestra Señora de la Limpia y Pura Concepción (1641). Dehua kilns, Fujian province Ming dynasty, Chongzhen reign (1628-44)
The Spanish Bernardo de Balbuena while describing the affluence of the capital in his poem *Grandeza Mexicana*, published in 1604, mentions ‘the fine porcelain of the timid Sangley’ among the Asian goods imported.\(^{20}\) By then, the demand for porcelain was so great that it was consumed as a trade good and acquired from street markets, pedlars, second-hand markets and even shops.\(^{21}\) The commercial networks of the wealthy merchant class (including Spanish and Portuguese) with factors and agents in key locations, such as Veracruz, Mexico City and Puebla de los Ángeles, facilitated the wholesale and retail sale of porcelain and its wide distribution throughout the viceroyalty, as well as its re-export to Spain.\(^{22}\)

Tangible evidence of the distribution and consequent consumption of various types of porcelain within the viceroyalty is provided by archaeological finds in what is now Mexico, the United States and Guatemala. Not surprisingly, the urban and religious sites located in Mexico City have yielded not only the largest quantity of porcelain but also the most varied in terms of typology and decorative style. The majority is blue-and-white of varying quality, dating from the Jiajing to Chongzhen reigns. Finds in the Zócalo area include intact pieces and shards of *kraak* porcelain, shards of trade blue-and-white plates with a phoenix design similar to those recovered from the *Baja California* (late 1570s) and the *San Agustin* (1595) shipwrecks, and the *San Pedro* which sank off the island of Bermuda in 1595, while sailing from Cartagena (present-day Colombia) to Spain. The area also yielded porcelain from the kilns of Fujian, including Zhangzhou porcelain decorated in underglaze blue or in overglaze enamels, which relate to finds from the *San Diego* (1600), and *blanc de chine* porcelain from Dehua. The latter include a fragment of a
Buddhist Lion incense stick holder, which considering the example recovered from the *Nuestra Señora de la Limpia y Pura Concepción* (1641) and the ‘Ten little lions’ mentioned in the 1645 inventory of Lope de Osorio, probably arrived to Mexico City by the early to mid-1640s. Further finds of *kraak* and Zhangzhou porcelain have been made at the former convent of Santa Paula of the Hieronymite order.²³

Porcelain found its way to the frontier provinces of New Spain. Judicial documents and wills of residents of Colima list porcelain as early as 1580. For instance, a judicial document of that year, mentions ‘2 large porcelains from China’ and ‘2 small porcelains from China’ among the belongings brought from Manila by a deceased sailor named Manuel Pérez; and a will made by Juana Quintero in 1622 mentions ‘2 porcelains from China’ and ‘2 medium plates [of porcelain] from China’.²⁴ The high esteem that the residents had for porcelain was shown in 1625, when Juan de Balamceda purchased ‘2 plates [of porcelain] from China broken’ at the public auction of the belongings of Gaspar Pagés de Moncada, the notary of the Almiranta *Nuestra Señora de Atocha* who died whilst he was being transported from the port city of Navidad to Colima.²⁵ It is clear that Balmaceda wanted to own porcelain so badly that he did not mind the poor condition of the pieces.

Porcelain shards have been also found in what was the isolated frontier province of Florida, prized by the Spanish for its strategic location for the Caribbean, the Gulf of Mexico and the Atlantic shipping routes. Four shards of blue-and-white porcelain, including one that probably formed part of a *kraak* bowl, excavated from the remains of Saint Augustine
(founded in 1565) are believed to have reached the settlement in about 1576-78. 747 shards of blue-and-white porcelain were excavated at Santa Elena (present-day Parris Island in South Carolina), which was originally intended as the capital of Florida and occupied only from 1566 to 1587. Most of the shards are of plates from Jingdezhen, including some with the phoenix design similar to those excavated in Mexico City. There are also a few shards of blue-and-white Zhangzhou porcelain.26 By the early 17th century, a small quantity of porcelain made its way to the northernmost province of New Mexico. Shards have been excavated at both urban and rural settlements. The blue-and-white and *kinrande* porcelain from Jingdezhen excavated at San Gabriel del Yunque, the capital of New Mexico founded in 1598, must have arrived there before 1610, when the settlement was abandoned.27 Shards of both types were also excavated at the Palace of the Governors in Santa Fe, where the capital was relocated after abandoning San Gabriel. They include a blue-and-white shard that may have formed part of a high-quality ewer made in the so-called Transitional style during the Chongzhen reign.28 The porcelain could have been brought by the colonists when they emigrated there to maintain their manners and polite behavior to reaffirm their cultural ties to Spain, or could have arrived through the overland mission supply caravans provided by the Spanish Crown.29 In addition, the few shards found at rural sites near Santa Fe indicate that colonists in isolated *estancias* (ranches) had both the desire and the economic capability to acquire porcelain, if only in small quantities.30

Textual sources indicate that porcelain was among the common household items owned by Spanish colonists in Puebla de los Angeles, a city situated midway on the mule route overland from Acapulco to Veracruz. An early example is found in the 1589 inventory of the
belongings of Jerónimo de la Fuente, who was a master mason from Toledo, which lists a ‘dozen Chinese plates and bowls valued at 5 pesos, two large porcelains of China valued at 3 pesos’. The presence of porcelain in this area is further demonstrated by a few shards of blue-and-white porcelain excavated northwest of the city at the church and convent of San Miguel in Huejotzingo, built by Franciscan friars between about 1554 and 1570.

Shards of blue-and-white porcelain from Jingdezhen and Zhangzhou have been also excavated at various religious sites in southern New Spain. These include the remains of the Dominican convents in Oaxaca and Santiago de Guatemala (present-day La Antigua Guatemala), and the former Franciscan monastery in the latter city.

**Trade to the Viceroyalty of Peru**

In 1582, a ship from Manila arrived to El Callao, the port near the viceroyalty’s capital, Lima. She was carrying silk, porcelains, spices, iron was and other wares. The porcelain listed as private consignments on the register of the ship *Nuestra Señora de la Cinta*, taken a year earlier, included a large number of pieces described as ‘gilded’, which considering the 22,300 pieces of ‘fine gilt china’ imported into Acapulco in 1573, were most probably *kinrande* porcelain. A document dated 1583, in which a sea pilot describes the contents of the cargo, mentions that the ship was carrying ‘pottery blue and gilt’. This suggests that the cargo consisted of both blue-and-white and gilded porcelain, and perhaps that some pieces were decorated with underglaze blue as well as overglaze gold.
However, a royal order imposed by Philip II in 1581 forbade the direct trade between Lima and Manila. The great concern of the Spanish Crown for maintaining a monopoly of trade in that region and for keeping its New World precious metals within the Spanish Empire led to a law passed in 1591, and re-issued in 1592, 1593, 1595 and 1604, forbidding trading between Peru, Tierra Firme, Guatemala or ‘any other part of the Spanish West Indies, and China or the Philippines’. Peruvian merchants, commonly known in the colonial period as *peruleros*, were thus forced to acquire porcelains by way of Acapulco, where they organized a profitable trade with the Manila representatives. The seemingly unlimited supply of silver in Potosí and other mines in the viceroyalty stimulated illicit trade so vigorously that in 1634 Philip IV definitively forbade all trade between the two viceroyalties. The porcelain shards excavated at various archaeological sites in present-day Peru, Panama, Ecuador, Argentina and Chile attest to this illicit trade in porcelain brought by the Manila galleons.

Unsurprisingly, porcelain found consumers of the highest levels of society in Lima. A *kraak* plate bearing the impaled arms of García Hurtado de Mendoza, 4th Marquis of Cañete, and his wife, Teresa de Castro y de la Cueva, attests to the colonial elite’s high appreciation for porcelain (Fig. 10). This plate, the only known armorial porcelain for the Spanish market dating to the 16th century, was made as a special order at the kilns of Jingdezhen. It was most probably ordered via Manila during the time Hurtado de Mendoza was the 8th viceroy, between 1589 and 1596. The plate, and perhaps also others like it, would have served to display the couple’s high social stance within the viceregal court of Lima. In addition, porcelain has been excavated at both secular and religious sites. Finds
made at the Palace of Justice include *kraak* and trade blue-and-white porcelain from Jingdezhen, and Zhangzhou porcelain decorated with overglaze enamels (Fig. 11). An old colonial house, now the Museo de Sitio Bodega y Cuadra, also yielded a few pieces of *kraak* and trade blue-and-white porcelain (Fig. 12), as well as of Zhangzhou blue-and-white porcelain.40 Excavations at the Casa Osambela, which formed part of a Dominican monastery, yielded shards of plates and cups which most probably formed part of *kraak* porcelain.41
Fig. 11 (right): Shards of a Zhangzhou dishes and a bowl with overglaze enamel decoration excavated in front of the Palacio de Justicia, Lima. Zhangzhou kilns, Fujian province Ming dynasty, Wanli/Tianqi reign (1573-1627) Reproduced by courtesy of Juan Domingo Mogrovejo Rosales

Fig. 12: Fragment of a Kraak dish excavated at an old colonial house, now the Museo de Sitio Bodega y Quadra, Lima. Jingdezhen kilns, Jiangxi province Ming dynasty, Wanli reign (1573-1620) Museo de Sitio Bodega y Quadra, Lima
In the viceroyalty of Peru, as in New Spain, porcelain was far more abundant and cheaper than the European majolica imported from Seville. Thus porcelain found its way to colonial settlements in northern and southern Peru, where the residents who did not belong to the highest social classes acquired a few porcelain pieces. Finds in northern Peru have been made at the colonial coastal town and church complex (established and run by the Dominicans) of Magdalena de Cao Viejo in the Chicama Valley. Other porcelain shards associated with the Dominicans were found at a former temple compound in the town of Chucuito located north west of Lake Titicaca. A number of shards of kraak porcelain were excavated from the ruins of the convent of nuns of the Concepción in the old city of Panama on the Pacific coast of present-day Panama. Other finds in the city include several shards of Zhangzhou blue-and-white porcelain. A very unusual find is that of a few shards that formed part of a phoenix-shaped ewer decorated with overglaze enamels on the biscuit. Excavations at the Santo Domingo monastery in Quito, Ecuador, yielded shards of blue-and-white porcelain probably dating to the early 17th century. The presence of porcelain in Quito is further demonstrated by the 1596 will of María de Amores, an Indian woman who had twice married a Spanish husband, which lists a large Chinese porcelain jar among her belongings. Two kraak shards were excavated in a domestic site in Cuenca. The porcelain probably reached the city through Guayaquil, where by the late 16th century porcelain and silks transshipped from the Manila galleons arrived at the market for sale. In Santa Fe La Vieja, in the north east of Argentina, were excavated shards of Jingdezhen trade blue-and-white, kraak and Transitional style porcelain (Fig. 13). This site also yielded a few shards decorated with overglaze enamels showing traces of gilded decoration, which probably formed part of kinrande ewer or bottle (Fig. 14). Textual sources attest to the presence
of porcelain in the city in the early years of the 17th century. For example, the 1606 will of Feliciano Rodríguez lists ‘a little porcelain from China’. Finally, a few tiny shards of Jingdezhen blue-and-white porcelain dating to the early 17th century were excavated in Santiago, Chile.

The impact of Chinese porcelain on the local ceramic industry

Majolicas were integral to most daily life activities in Renaissance Spain, including sanitation, food preparation and storage, architecture and religion, and in the Spanish colonies in the New World they became an essential symbol of Spanish ethnicity and social status. The Spanish, as
noted by McEwan, had a penchant for ostentatious public displays of wealth and this was particularly reflected in the majolica tablewares used by the colonial elite, which they considered an essential component of etiquette and propriety. They were imported from Seville and sold at very high prices until Spanish potters arrived and introduced the potter’s wheel, tin- and lead-based glazes and up-draft kilns to New Spain in the early 16th century. Majolica, referred in colonial textual sources as loza, was probably being produced by 1550 in Mexico City. A recent study by Yanes Rizo has shown that by 1550 majolica potters were present in the nearby city of Puebla de los Angeles, which not only facilitated access to the raw material but was also strategically located between Mexico City and Veracruz. These centres of majolica production supplied the Spanish colonists with tablewares and other utilitarian objects that replicated those available from their motherland.

Textual and material sources show that the large quantities of Chinese porcelain imported into the New World colonies via the Manila-Acapulco route in the late 16th century and early 17th centuries had a profound and lasting impact on the local ceramic industries in both New Spain and Peru. As we have seen, the imported porcelains were not only acquired and used by individuals of their respective multi-ethnic colonial societies of all social classes, but they also became objects for imitation by local majolica potters. The potters, particularly those in Puebla, understood the increasingly high level of esteem the colonial elite held for porcelain and therefore attempted to make their majolica products more marketable by imitating it. By 1620, the Puebla potteries established by a few Spanish brought by the Dominicans from Seville and Genoa had passed to their sons or apprentices, generally Creoles or mestizos, who produced their
own majolica style combining Spanish, Italian and local techniques during the period from 1550 to 1650.\textsuperscript{59} In the 1640s, when the porcelain imports became scarce because of internal struggles in China, they responded rapidly to the high consumer demand for New World majolica imitations.\textsuperscript{60}

This brief essay has underscored the fact that the overwhelming majority of the porcelains imported into the New World colonies at the time were blue-and-white from the kilns of Jingdezhen, and that among them, \textit{kraak} was by far the largest import. Thus it is not surprising that the potters imitated the new imported porcelain shapes and incorporated the distinctive panelled \textit{kraak} style and exotic decorative motifs with those of indigenous Mexican origin. East and West merged in the new majolica decorative repertoire which incorporated various Chinese inspired motifs: garden or rocky landscapes, phoenixes, cranes, chrysanthemums or flowering prunus, with European and/or indigenous motifs such as the \textit{nopal} cactus (a reference to the symbol of the Aztec Empire) (Fig. 15) and the quetzal bird (highly prized in pre-Columbian Mesoamerica) (Fig. 16). Without doubt, the potters in Puebla had plenty of opportunity to admire the varied and rich decorations of \textit{kraak} and other types of porcelain imported. They reinterpreted their motifs and created a new exuberant style of majolica from the second quarter of the 17\textsuperscript{th} century until well into the 18\textsuperscript{th} century, which is usually painted with thick brushstrokes of cobalt blue in relief. Majolica wares from Puebla, particularly those decorated in cobalt blue, were destined to the colonial elite who lived within the territory of New Spain. By 1653, the number of majolica workshops in Puebla had grown to such proportions that the colonial government passed the first Ordinances for guilds of potters (which regulated the industry until 1820). Additional Ordinances adopted in 1682 stipulated that on the fine wares
the ‘colouring should be in imitation of the Chinese ware, deep blue, finished in the same style and with relief work in blue, and on this style of pottery there should be painted black dots and grounds in colours’. This is attested by the shards imitating *kraak* porcelain excavated at the Casa del Mendrugo, which was built and occupied by the Jesuits until their expulsion in 1767 (Fig. 17).

*Fig. 15: Majolica jar.*
*Puebla de los Angeles, Mexico, made in about 1700*
*Victoria and Albert Museum, London*

*Fig. 16: Majolica basin.*
*Puebla de los Angeles, Mexico, made in 1650-1725*
*Victoria and Albert Museum, London*
Archaeological excavations in the Zócalo area of Mexico City have brought to light a large number of Puebla majolica shards decorated in *kraak* style. These were excavated from a waste pit of the colonial period and the area underneath what was the building Seminario Conciliar and from Plaza Manuel Gamio, just in front of the Templo Mayor. Analysis of the shards excavated reveal that they formed part of jugs, plates, cups and some miniatures (plates and bottles), decorated with panelled borders. Another Puebla shard that formed part of a plate with a panelled rim was excavated from Justo Sierra Street. In Oaxaca, excavations at the former convent of Santo Domingo yielded shards of Puebla majolica of the types known as San Agustín Blue/White (Fig. 18), San Gabriel (Fig. 19) and San Luis blue-and-white, which show *kraak* style panelled borders.
By the mid-17th century, the influence of *kraak* porcelain had also reached some majolica manufacturing centres in the viceroyalty of Peru. Archaeological excavations at the site of Panama La Vieja yielded some shards of Panamanian majolica, which show decorative motifs inspired by *kraak* porcelain. The production of white majolica at Panama La Vieja
began sometime in the late 16th and that of blue and white, green and brown, in the first decades of the 17th century. The majolica blue and white wares show a pale cobalt blue decoration, which is less dense and has less relief than that of Puebla wares.

Textual evidence shows that imitations of porcelain were being made in Lima by the second quarter of the century. This is clearly stated in an account of the Jesuit missionary Bernabé Cobo, written during a trip to New Spain between 1629 and 1642. In about 1630 Cobo recorded that ‘Pottery so choice and so well glazed is made so that of Talavera is not needed, because in the past few years, they began making imitations of that of China, which looks very much like it, particularly that made at Puebla de Los Angeles in New Spain and in this city of Lime [Lima]. It is very good, beautifully glazed and coloured’.66 This is confirmed by a few archaeological finds from the city. Two shards of majolica decorated with kraak style panelled borders were excavated from a former refuse mound on Bolivia Street.67 These shards, now in the Instituto Riva-Agüero Mogrovejo in Lima, date to the first half of the 17th century. They formed part of dishes that may have been made by local potters (both Spanish and mestizo) at the majolica workshops located in the central area of Lima.68 In addition, a number of majolica shards showing kraak style panels were excavated in front of the Palace of Justice, from a context dating to the mid-17th century (Fig. 20).
To sum up, this essay has briefly outlined the trade of large quantities of various types of Chinese porcelain via trans-Pacific trade route of the so-called Manila galleon to the Spanish colonies in the New World in the late 16th and early 17th centuries. It has provided textual and material evidence of the widespread distribution and consumption of the imported porcelains and their socio-cultural significance, as well as of the lasting impact that they had, especially the mass-produced kraak porcelain, on the local industry of majolica in the viceroyalties of both New Spain and Peru.

**Endnotes**

1 Hereafter referred to as porcelain.

2 The Spanish eastward route, which became part of the first global trade route in history, connected Manila with Acapulco across the Pacific, Acapulco with Mexico City overland and finally Veracruz with Seville (later Cadiz) across the Atlantic until 1815. The Spanish trans-Atlantic trade in porcelain is out of the scope of this article. For a recent discussion on this


6 The shipwreck may be the galleon San Juanillo, which is recorded as having been lost without trade in 1578. Roberto Junco (ed), Porcelanas del Galeón de Manila en Baja California, México. Catálogo – Porcelains from the Manila Galleon in Baja California. Catalogue, Mexico City, 2017.


Cited in Ibid., p. 205, note 1.


I am grateful to Jack Harbeston, IOTA Partners, for providing me with images of the porcelain recovered from the shipwreck.


I am greatly indebted to Dr. Roberto Junco Sanchez, INAH, for granting me permission to study the porcelain finds during a research trip to Mexico City in June 2017.

China held the monopoly on the production of porcelain over centuries and exported their high quality wares throughout Asia. Japan began producing porcelain in about 1610. The raw materials and technical knowledge for its manufacturing process (kaolin and kilns that fired at high temperature) were unknown in Europe or the New World at the time.


Canepa, 2016, pp. 240-41.

Silver objects were very expensive at the time, but they had an intrinsic value. They could be melted down and made into coinage or recycled as different objects. José Luis Gasch-Tomás, Global Trade, Circulation and Consumption of Asian Goods in the Atlantic World: The Manila galleons and the social elites of Mexico and Seville (1580–1640), unpublished PhD Thesis, European University Institute, Florence, 2012, p. 162.

Bernardo de Balbuena, Grandeza Mexicana, Mexico, 1604, Chapter 3, p. 77.


We know that at least a few civil servants and other residents acquired porcelains and subsequently sent them to Spain. In 1587, for example, Dr Hernando de Robles of the Council of His Majesty sent ‘two crates of pottery from China’ to Luis de Arauz in Seville, to be then sent to Madrid. Four years later, Sebastián Villena de Cárdenas sent dozens of porcelain pieces to Seville, to be delivered to his brother Juan del Valle de Villena of the Royal Council of Castile in Madrid. For more information, see Canepa, 2016, p. 241.

For these archaeological finds and bibliographical references, see Ibid., pp. 242-43.


Donna Pierce, “At the Ends of the Earth”. Asian Trade Goods in Colonial New Mexico, 1598–1821’, in Donna Pierce and Ronald Otsuka (eds.), At the Crossroads. The Arts of Spanish America & Early Global


32 Ibid., pp. 49-50.

33 For a discussion of these finds and bibliographical references, see Canepa, 2016, pp. 246-47.


35 Cinta Krahe, Chinese Porcelain in Habsburg Spain, Centro de Estudios de Europa Hispánica (CEEH), Madrid, 2016, Appendix 3, Doc. 2, pp. 503-04.


For a recent discussion on this armorial plate, see Canepa, 2016, pp. 273 and 276, fig. III.181.

Ibid., pp. 251-52, figs. III.147-49.


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Session 14: Beyond the South China Sea: Cross regional studies of maritime communities

The history of Southeast Asia is marked by the strong maritime networks that were established since prehistoric times within the boundaries of mainland Southeast Asia, island Southeast Asia, and southern China. These connections, which extended beyond their barriers to reach Far East Asia and India, had the South China sea as its nodal hub for trade networks. Similar maritime hubs developed in other regions of the world, like the Mediterranean, the Baltic and North Seas, the South Pacific, or the East China Sea. Ongoing research in these areas have produced solid theoretical frameworks and relevant case studies that can be of great use for the study of Southeast Asian maritime communities. Westerdahl's concept of the Maritime Cultural Landscape brewed on the shores of the Bothnian gulf in the Baltic sea, but this theoretical framework is now applied in many regions of the world. In the Mediterranean, Braudel's conceptualization of the northern and southern shores as a single entity has often been used to define the boundaries of Southeast Asia by researchers such as Manguin or Reid. These examples show that finding common ground with researchers studying maritime cultural clusters can result in the cross-pollination of ideas and methods.

This panel seeks to bring together case studies from across these regions to generate debate that will help to further develop the theoretical framework of maritime archaeology in Southeast Asia. We encourage the submission of papers with clear theoretical approaches or analytical frameworks that may be replicated in other maritime clusters.

Session Chair: Dr. Brian Fahy
One boat-building tradition? How can Lake Lugu in Yunnan/Sichuan province, Lake Suwa in Nagano prefecture, Lake Ohrid in Macedonia and Lake Cerknica in Slovenia be connected? Preliminary research

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Abstract

What do lakes that are separated by up to 9,500km have in common? These are Lake Lugu, Lake Suwa, Lake Ohrid and the Ljubljanica River Basin. It is impossible to imagine what could bring these together, since different cultures were living in the Japanese “Alps”, the Mosuo people in China and on the other side in the Balkans and the foothills of the Alps?

However, there is a field of study where we have a mentality that can be much closer than it appears. There are adamant similarities between four very common farm boat building traditions based on the logboat. These are the expanded logboat, which are, at least of traditional origin in the ‘Notranjski drévak’ (ang. Notranjska ‘treeboat’) from the Ljubljanica River Basin, which most likely evolved entirely indigenously in the region. The most convincing similarity is in the design features and parts of the boats. The backbone consists of chine-girders with a C or L cross-section and inserted bottom planks. The combination of bow and stern could be slightly different. All boats are very similar in width and length. Such a construction provides excellent stability and the boat is almost impossible to overturn. These were farming boats intended for local activities, such as cargo transportation, social life, fishing and hunting.

It might be that the tradition for all four boats would be unique and they all arise from one boat-building tradition. However, at least for ‘Notranjski drévak’, we can assume that the origin lies in the Celtic-Roman shipbuilding tradition that arose in the area of the basin of the Ljubljanica
and Kupa Rivers. The Lake Ohrid ćun even suggests that the boatbuilding skills here derive from Celtic-Roman tradition, but the answer to the question about the influences behind the boat construction at Lake Lugu and Lake Suwa is not as self-evident.

**Key words:** boatbuilding, lakes, landscape, logboat

**Introduction**

While investigating the roots of the boat building tradition of *Notranjski drevák* from the Ljubljanica River Basin in 2014-2015 due to registering this old Slovenian boatbuilding tradition on the national list of intangible cultural heritage, we first observed the traditional *marutabune* from Lake Suwa through an internet visual archive.

This discovery attracted our attention due to the unbelievable similarity in boatbuilding in these regions 9,500km apart. Later, we also discovered an amazing similarity in extended logboat construction in the boatbuilding tradition of Lake Lugu on the border of Yunnan and Sichuan in China, and finally on Lake Ohrid in Macedonia. What is going on? (Fig. 1)

*Fig. 1: Locations of the four different region in Europe, China and Japan (Gal - Peters Earth projections).*
Environmental

Lake Lugu between Yunnan and Sichuan province, China: Lake Lugu lies in south-west China on the border between the Yunnan and Sichuan provinces. The closest larger town to the south is Kunming in Yunnan province, and in the north-east, it is Chengdu in Sichuan province. It is a natural lake in the Hengduan Mountain System, which is the eastern foothills of the Tibetan plateau and consists of Himalayan leucogranite. It is located on a high plateau with a surface elevation of 2,685 metres in the middle of the Xiaoliangshan hills by the Lion Mountain. This sub-alpine zone in the southern Hengduan Mountains is covered with rich forest habitat mainly of Yunnan pines (*Pinus yunnanensis*), Chinese pines (*Pinus armandii*), lacquer (*Toxicodendron vernicifluum*), camphor (*Cinnamomum camphora*), kapok (*Ceiba pentandra*) and dragon spruce trees (*Picea asperata*). Lake Lugu is bounded on all sides by mountains and partially forested slopes. The lake has a length of 9.4 kilometres, a width of 8 kilometres, a water area of around 49 square kilometres and a maximum depth of 95 metres, making it the second deepest lake in China. The primary inflows are the Mosuo River, and the outflows are the Gaizu and Yalong Rivers. Geologically, it is inferred to be one of the youngest fault lakes in the Yunnan Plateau. The lake waters exhibit transparency to a depth of 11 metres, and there are four peninsulas and five islands. The history of the place is known back to the Middle Ages when Kublai Khan and his Mongolian army established a headquarters south of Lake Lugu. However, it is also well known for its matriarchal culture and for the dress of the Mosuo women and girls in particular, which is conspicuous for its maroon blouses and skirts that establish an aura of authority (Xing, 2017; Chung, 2005; Wikipedia, 2017; L.L.M, 2006).
Lake Suwa in Nagano prefecture, Japan: Around 3,700 kilometres to the north-east in the middle of the biggest Japanese island of Honshu, in the Nagano and Gifu prefectures, is a group of mountains collectively known as the Japanese Alps (Chūō Arupusu). They consist of the Hida Mountains (Hida Sanmyaku), also known as the Northern Alps (Kita Arupusu), the Kiso Mountains - Central Alps (Kiso Sanmyaku - Chūō Arupusu) and the Akaishi Mountains - Southern Alps (Akaishi Sanmyaku - Minami Arupusu). However, the range mainly consists of Cenozoic granitic rocks and Jurassic accretionary prisms (Taira, 2001; Sueoka et al., 2016). Lake Suwa is situated between the tripoint of Hida, Kiso and Akashi Sanmyaku and just 70 kilometres south of Nagano. The subalpine zone of the Suwa Lake environment is mainly inhabited by conifer (Abies veitchii, Tsuga diversifolia, Larix kaempferi, Pinus densiflora) and evergreen broad-leaved (Quercus mongolica, Betula japonica) forest zones (Miyawaki, 1973, 1984; Sharma 2016). The size of Lake Suwa is around 13 square kilometres with a maximum depth of 7 metres. Its surface elevation is 759 metres with the inflow of 31 small rivers from the Kiso Mountains and the outflow of the Tenryū River. Lake Suwa is the site of the interesting natural phenomenon of a hot spring under its surface. When the lake's surface freezes in the winter, its lower waters are still circulating. This results in ice pressure ridges forming in the surface ice, reaching heights of 30 centimetres or more. An interesting local particularity is The Onbashira Festival (Japanese: 御柱祭 Onbashira Matsuri or "Honoured Pillars Festival"), which is one of the oldest festivals with an uninterrupted 1200 year history which shows how highly connected the local inhabitants are to nature and the forestry landscape in this area. The festival is held every six years, and the main topics are to symbolically renew the four shrine buildings by felling sixteen fir trees, preparing them as honoured pillars (onbashira), and transporting them
down a mountain to the shrine. Participants ride the onbashira as they are slid down the mountain, dragged to the shrine, and raised. It has a reputation as the most dangerous festival in Japan since participants risk being injured or killed when riding the logs (Sueoka et al., 2016; SBSI, 2003; Robertson, 2013; Miura, 2016).

**Lake Ohrid, Macedonia:** Let turn 9,400 kilometres to the west and to the Balkan Peninsula in Europe. One of the most remarkable landscapes is the mountain chain stretching from south-east to north-west along the east coast of the Adriatic sea called the Dinarides, the Dinara mountain or the Dinaric Alps. The Dinarides geologically consist of Mesozoic limestone forms, notable for features such as the Karst, which has given its name to all such terrains of limestone eroded by groundwater. The basic vegetation cover is two major forest zones. A conifer zone (*Picea abies, Abies alba, Pinus nigra, Picea omorika*), which characterises the highest elevations above 1,200 metres in altitude. Below this elevation, mixed broadleaf (*Fagus sylvatica, Quercus: ceris, robur and petraea, Carpinus betulus, Fraxinus excelsior, Ulmus minor, Tilia, Acer, Sorbus and other*) forest is mostly present (Mihevc et al., 2010; WWF, 2017). Just on the south-east edge of the Šar-Korab massive, part of Dinaric Mountains, Lake Ohrid is situated on the mountainous border between southwestern Macedonia and eastern Albania. Lake Ohrid is the deepest lake in the Balkans and one of the deepest in Europe, with a maximum depth of 288 metres, it covers an area of 388 square kilometres, and it has a surface elevation of 693 metres above sea level. The main inflow is from the Sateska River, which is connected to nearby Lake Prespan through underground watercourses in the karstic landscape. The outflow of the lake is the Black Drin River to the north through Albania to the Adriatic Sea. It should be mentioned that Lake Ohrid is one of the oldest human
settlements in Europe. At Plate Michov City, a prehistoric pile settlement was discovered belonging to the Late Bronze and Early Iron Age. Lake Ohrid was colonised by Illyrians in the 5th century BC. Archaeological findings show an Illyrian settlement that was fortified in the 4th century BC. By the 3rd Century BC, Roman forces had taken control of Pogradec. The Via Egnatia road is found in the Pogradec region, near to the shores of Lake Ohrid, and is evidence of the former Roman presence. Ohrid town was mostly built between the 7th and 19th centuries. Ohrid is home to the oldest Slav monastery and more than 800 Byzantine-style icons of worldwide fame dating from the 11th century to the end of the 14th century (Spirkovski et al. 2000; WHL, 1979).

Ljubljanica River Basin, Slovenia: Lastly, around 750 kilometres from Lake Ohrid at the Northwest end of Dinarides where they connect to the Alps and Karst region, we can find the Ljubljanica River Basin. Because of the specific geological structure of the Dinarides to the south, which is Mesozoic limestone forms, and the Eastern Alps mountain range on the other side, the area is under extreme compressive stress and pressure, uplifting marine sedimentary rocks and creating characteristic recumbent folds, or nappes, and thrust faults. However, the bedrock of this geological formation is extremely soluble, as can be seen in the Karstic character of this landscape where more than 11,000 caves are recorded on at least 8,000 square kilometres (Gerrard, 1990; Graciansky, 2011). The vegetational cover is nearly the same as it is near Lake Ohrid, consisting of two major forest zones. A conifer zone (Picea abies, Abies alba, Pinus nigra, Picea omorika) and mostly a mixed broadleaf zone (Fagus sylvatica, Quercus: ceris, robur and petraea, Carpinus betulus, Fraxinus excelsior, Ulmus minor, Tilia, Acer, Sorbus and other) (Mihevc et al., 2010; WWF, 2017). It is not surprising that such a landscape is home to the river
with seven names. It starts is as the Trbuhovica near the border with Croatia and disappears into the karstic field of Babno Polje. However, the same process continues all the way to the point where it flows into the Sava river. Next is the Obrh river running through the Lož Valley, then the Stržen river through the Cerknica Field, the Rak River through the Rakov Škocjan Valley, the Pivka River through the Pivka Basin, the Unica River in the Planina Field and finally the Ljubljanica river as it flows through the Ljubljana Marshes (Gams, 2004). Meanwhile, the Karstic character of the valleys, fields and marshes means that water in this area can outflow very slowly and over a long time, meaning that the water can stagnate for a longer period. However, this also means that all these landscapes could be flooded, even up to ten months per year. That means that past residents near the Lož Valley, Lake Cerknica, the Planina field and the Ljubljana Marshes, mostly live near up to 5 metres deep intermittent lakes. The Ljubljanica River Basin is abundant with water, as the water is collected from 1884 square kilometres. The Ljubljanica riverbed and Ljubljana Marshes are one of the most important archaeological sites in Slovenia in its 170 square kilometres. It has the world-renowned and UNESCO-listed monuments of Alpine pile dwellings, a 45,000 year old wooden hunting point, the oldest known wheel, more than 70 logboats, three Roman Age flat bottom ships and many other significant findings and sites (Velušček, 2005; Velušček et al. 2009; Erič et all 2014; Gaspari et al. 2011).

Extended logboats

Lake Lugu: The extended logboat from Lake Lugu (Lúgū Hú 浙湖) was observed coincidentally when searching the internet a few months ago — however, later research failed to find any serious studies about boat construction. However, because Lake Lugu with its resident’s Mosuo
minority ethnic people is a rare and exotic world travelling region, plenty of photographic material including the traditionally extended logboats was accessible. Through a study of this photographic material, it was possible to make a rough reconstruction of many construction details. By comparing with the other extended logboats mentioned here, it was possible to recognise the basic similarity with the others in all areas except the wood species. However, as this region is characterised as a subalpine zone with mainly mixed coniferous and broadleaf forest, it can be assumed that the boats are made from one of the local species of pine wood. The extended logboats are known as Zhu cao chuan (豬槽船), which in the local language means "pig trough boats", and they were used for fishing, farming and living purposes by the local ethnic group. After reconstruction using the available photographic material, a 3D model was generated and compared with the other similar extended logboats analysed in this article. However, they seem to be mainly built in a ratio of 1:6.1 and were usually used for fishing activities, rather than for the transport of people and goods in the farm’s villages of the region as well. They seem most likely 7 and up to 10m long with the width of the boat about one metre. It is hollowed into two chine-girders with a C cross-section and a tiny concave bottom plank inserted. The boat is also expanded with 10 cm high vertical gunwale planks up to the chine-girder stern and bow, which consists of the bottom planks rising in a gentle curve. The Zhu cao chuan seems to be a wide and very stable fishing and farming boat with a flat bottom, which cannot be overturned (Fig. 2).
Lake Suwa: The boats on Lake Suwa traditionally include extended logboats (marutabune 丸子船), a survival of the basic logboat (kuribune 剋舟), and plank boats (sampan 板) with a strip-plank construction (hagibune 舟剥). The standard lengths, as taken from Shimosuwa's Cultural Heritage register (Shimosuwa-machi Bunkazai Senmon Iinkai 下諏訪町の文化財, SBSI, 2003: 132) is up to 7 metres, and they have a ratio of 1:6.3. They were traditionally intended for fishing on Lake Suwa, as well as for the transport of people and goods between the farms and villages of the region. The width of the boat is about one metre, and in Meiji period they were traditionally hollowed from keyaki (Zelkova serrata), katsura (Cercidiphyllum japonicum) or chestnut trees (Castanea crenata). However, they later began to use Japanese larch (Larix kaempferi). These were hollowed into two chine-girders with a C or L cross-section and a flat bottom plank inserted. Three boards are laid side by side and joined in the centre, making six planks. Since the curved gunwales are attached to one
another, they required considerable craftsmanship, and thus gave the boat builders an opportunity to showcase their skills. The forward and aft sheer of the flat bottom (shiki) confers a slightly trough-shaped form that makes them extremely easy to manoeuvre. The weight of the hull confers a high degree of stability, and it is said they are strong in the wind. Since the boats do not rock, capsizing is rare. In addition to the forward sheer, the high deck offers a broad field of view and allows nets to spread out when cast. As one’s feet are well down between the gunwales, there is little danger of falling overboard. In cold weather, they also had the benefit of being cosy, and the gunwales would hold in the heat and smoke when someone brought along a hot-pot (hinabe) and lit a small fire on board to keep warm. The superiority of both structure and function made the Lake Suwa logboats strong in the waves, enabling fishing by day and night, even in foul weather. The boat had a lifespan of between 10 and 12 years. Navigation with oars requires specific skills and rowing through shallow and deep water are different (SBSI, 2003: 132; Robertson, 2013; Fig. 3).

**Fig. 3: Marutabune in the Suwako National Museum (left; SBSI 2003) and a landscape from Suwa Lake (right).** Available at: https://en.wikipedia.org/wiki/Lake_Suwa [Accessed July 10, 2017].

Lake Ohrid: The generic name for fishing and farming boat in the Macedonian language is Ćun, and the term is also simply a personal
name for the particular kind of boat construction examined in this article. Like the other ones, the Ćun is an extended logboat and, aside from tiny design difference, it is analogous to the Lugu, Suwa and Notranjska boats in its significant constructional details. In its contemporary form, it seems to have a highly baroque design, which has no exact fundamental reason. Today, studies by Goran Patčev and Vesna Naumovska from the National Institute for heritage protection and the Museum of Ohrid (Stavrić, 1983; Patčev and Naumovska, 2014) declared that it is 5m long and 1.1m wide in bow cross-section and 1.9m wide in stern cross-section, with an average ratio of 1:2.6. However, the basic constructional fundamentals are the same as the other compared boats. This means two chine-girders hollowed into a C-shape cross-section with inserted bottom planks, with uprising bottom planks in the stern and bow section. Like the Lugu boat, it is expanded by 30cm vertical gunwales. These are additionally expanded by higher stern planks and an extremely high the bow section. However, critical studies of accessible historical photography from the end of 19th and beginning of 20th centuries show a less standardised tradition with more similarity to the others. Moreover, it is known that the boats were traditionally used for fishing and farming needs on the lake (Fig. 4).

Fig. 4: Ćun od Ohridsko ezero (left; credit by the National Institute for heritage protection and the Museum of Ohrid) and a landscape from Ohrid Lake (right). Available at: https://sl.wikipedia.org/wiki/Ohridsko_jezero [Accessed July 10, 2017].
**Ljubljanica River Basin:** The original name of this extended logboat was ‘Notranjski drevák’ (Eng. *Notranjska tree boat*), and it was made in two or more lengths. Compact, standard lengths of up to 7 metres have a ratio of 1:4.8 and were intended for the transport of people and goods between the farms and villages of the region. The larger drevák, up to 14 metres, was fundamentally used to transport large cargoes and livestock, but the ratio was changed to 1:10 because the standard boat width was the same as that of the shorter one. In both versions, the width of the boat is about one metre, and the pendulum is up to ten centimetres. It is hollowed from a fir tree (*Abies Alba*) into two C or L cross-section chine-girders with a flat bottom plank inserted. The central bottom planks were regularly a width of 70 centimetres, and there were most often two, but sometimes three planks. However, they never exceed the width of a single bottom plank. The decision is likely due to the availability of suitable material. The stern and bow consist of four bottom planks in a gentle curve cut out from a naturally curved fir. The chine-girder and the bottom plank are bound with iron nails, in the middle, right and left. In the end, the outer and inner surfaces are carefully sanded. Longitudinal joints are sealed with hemp (*Cannabis sativa*) twine. The boat has a lifespan of between 10 and 12 years. The *drevák* is a wide and very stable farming boat with a flat bottom, which cannot be overturned. Navigation with oars requires specific skills and rowing through shallow and deep water are different. Up to the 1960s, dreváks were used in the flooded Notranjska Karst fields for farming, fishing, hunting and transport throughout the Ljubljanica River Basin, in particular on the Ljubljana Marshes, the Planina Field, Lake Cerknica (Peršič, 2003), and the Lož Valley. (Fig. 5).
Environmental and constructional similarity and purpose

Environment: We would like to emphasise at list three important environmental characteristics of these different regions that significantly affect the behaviour of inhabitants in usage of and living in the landscape.

The landscape of these four different regions in entirely different parts of the world has surprisingly similar nature environmental and climatological characteristics. All of these landscapes are in subalpine zones. At first glance, Lake Lugu seems different to the others due to the high altitude – 2685m above sea level. On the other hand, it is much further south from the other region and the average temperature and humidity are nearly the same as in Lake Suwa, Lake Ohrid and the basin of the Ljubljanica River.

The next significant environmental similarity is that they are positioned in a configuration with mainly Alpine foothills. From the geological point of view, lakes with young highly eroded mountains around are classified as
alpine lakes. However, the Ljubljanica River Basin, lying in the foothills of the Alps, has a special Karstic character of flow through the rock to the intermittent lakes and finally finishing in the Alpine Sava River.

The third meaningful character of these landscapes that have a significant influence on the living condition and shapes human behaviour through the millennia is the vegetation habitats, which in all the regions are deciduous-coniferous woodland. That is a direct and significant influence manifesting the traditional use of elementary tree trunks for logboats and boat building in water-rich countries for fishing, hunting and farming necessities.

**Boat construction:** The most important characteristics of all four boats have so many similarities that they could be assumed and treated as the same type of boat. There are also some elements that vary (Fig. 6).

![Fig. 6: 3D models of the extended logboats from Lake Lugu - based on the available photographic material, Lake Suwa - based on plans and photography (SBSI, 2003), Lake Ohrid - based on plans and photography (Patčev and Naumovska, 2014) and the Ljubljanica River Basin - based on a photogrammetric 3D model. Important construction details determine all four extended logboats as the same type of farming boat in similar environmental landscapes (Modelled by LaniXi).](image)
**Chine-Girder:** the most important and significant construction details are the very prominent and robust chine-girders, which are carved from a tree trunk mainly with a C cross-section profile; however, version from the 20th century could also have an L shape.

**Bottom and Stern/Bow Planks:** between the extended chine-girders are installed one to three or four bottom and stern/bow planks, which probably depend on available raw wooden material.

**Gunwale:** the basic boat construction is upgraded with expanded elements – mainly as vertical gunwales or side planks. This is a basic element in the construction of the boats from Lake Lugu, Lake Suwa and Lake Ohrid, but not in the construction of those from the Ljubljanica River Basin. The intermittent character and temporarily existing lakes in the Lož Valley, Lake Cerknica, the Planina Field and the Ljubljana Marshes could explain this since all these lakes are never deeper than 2-3m. This means that even in heavy wind, it is physically impossible for high waves to develop.

**Stern/Bow Wale:** in all four constructions, we can see differences in the design of the stern and bow wale to firm up the body of the boat and also serve for accommodating users.

**Dimension:** All the boats range in length from 5m up to 14m in the case of some from the Ljubljanica River Basin. However, due to the underexplored backgrounds of Lake Lugu, Lake Suwa and Lake Ohrid, the same dimensions could be assumed. The width is nearly identical – 110cm to 130cm, which guarantees significant stability and allowing users to walk around the boat during fishing, hunting and farming activities. The ratio of length/width varies from 1:3.6 to as much as 1:10 in the case of longer versions of the extended logboat from the Ljubljanica River Basin.
**Application**: In all cases, the use of the boats is for fishing, hunting, farming and community life.

**Origin of the boat building tradition**

Research into the four specific extended logboats / farming boats with extremely similar construction, boatbuilding philosophies and use in completely different parts of the world, history and tradition is rare and exciting. As we researched the extended logboats from the Ljubljanica River Basin, the history of which could be traced back to the Roman empire with assumed Celtic-Roman north-east Adriatic shipbuilding tradition, it is difficult to make any final decision. However, for the **notranjski drevák**, we can assert that they are endemic and indigenously developed in the eastern hinterland of the Northern Adriatic Sea. Visual sources (engraving, photography) from the last few centuries and the testimony of knowledgeable witnesses allow us to conclude that the **notranjski drevák** was in regular use on the Ljubljana Marshes, the Planina Field, Lake Cerknica and the Lož Valley until the first half of the 1960s. The construction technique and details - from the selection of trees to launching - is today passed down orally from generation to generation, usually by boatbuilders and sometimes by farmers. In the case of the **notranjski drevák**, we have raised more new questions than we have answered. We have begun new research questions into the provenance of this particular kind of boat building construction. We have seen a long tradition of forms such as the C- or L-shaped chine-girder, the gentle curve with a longitudinal bilge in the bow and stern, a chine-girder joined with bottom planks using horizontal nailing into the planks, etc. New evidence from the Ljubljanica River Basin (Čufar et al. 2014) and the Kupa River Basin have given us an opportunity to conclude that this particular boatbuilding tradition stems from a more than 2000-year-old, probably
Roman-Celtic shipbuilding tradition. However, we are left with one open and unanswered question: why the similarities between types of extended logboat in entirely different regions of the world: China (Yunnan/Sechuan), Japan (Nagano), Macedonia and Slovenia?

According to the photographic source and accessible information, it is possible to say that the extended logboats from Lake Lugu, Lake Suwa and Lake Ohrid have been a part of the regions’ tradition for a long time – at least the last few hundred years.

**Conclusion**

Researching questions at this stage of discovering a possible single source of boatbuilding tradition of specific extended logboat construction is still open and without answers. However, we have enough evidence to assume that there is a relatively high possibility that all these four similar traditional boatbuilding styles could be developed without any influence between them.

We assume that the specific character of the natural environment and climate conditions, which are extremely similar in all four regions, lead inhabitants throughout the history to find very similar traditional construction solutions. Moreover, these could have the best characterization for the specific environment and purpose of use – fishing, hunting, farming and social apparatus.

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**Lailan Jaklič**, graduated in archaeology at the Faculty of Arts in Ljubljana with a thesis revolving around a very heritological issue concerning castles in Slovenia (*Castles in Slovenia: between science and public*), which led her to develop a deep interest in Heritology and issues concerning preserving and protecting all types of heritage through incorporating and involving the public in the process. In the couple of years following her graduation she hence started to develop her skills in the field of 3D modelling, animation, video/photo editing and photography, integrating her newly gained knowledge with her academic education, in
a quest for a responsible and informed use of these modern, non-destructive technologies in preserving and interpreting the past.

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Developing a new historiography – The Mao Kun map as a case study

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Abstract:

The voyages of Admiral Zheng He between 1405 and 1433 of the early Ming Dynasty have entered the worldwide public realm in the last twenty five years. However there is a lack of indigenous documentation for this historical period in many parts of the Indo-Pacific region and the process of interpretation of these voyages has been limited by the lack of an appropriate structure that accommodates traditional sources such as legends, folklore and traditional chronicles within a modern historiography based on, toponymy, archaeology, multi-lingual literary sources and cartography. The resulting interpretation has therefore been vague, erroneous, socially dividing, often Eurocentric and/or Sinocentric.

This paper covers the adoption of a new multidisciplinary historiography originating in the petroleum industry. This methodology has been used to analysis of a segment of a Chinese Mao Kun naval chart that was originally produced around 1422-23 before the sixth Zheng He voyage.

The results have provided increased accuracy and understanding of the Zheng He voyages and the Chinese world view, while also increasing the historical knowledge of Eastern Africa in the period just prior the first European incursions. Astonishingly on a site-by-site basis the results actually uphold archaeological finds and traditional chronicles and legends. The plan to extend this methodology to cover the Arabian Sea and Straits of Hormuz portion of the Mao Kun Chart is underway, and already yielded some preliminary outcomes. The adoption of this historiography with some adaptations may be used with other historical sources and in other regions of the Indo-Pacific region facing similar challenges with problematic data. One likely candidate for this historiography is the Selden Map.

Key words: Zheng He, Ming Dynasty, China, Treasure Fleet, Africa, cartography
Introduction

The voyages of Admiral Zheng He between 1405 and 1433 of the early Ming Dynasty have entered the worldwide public realm in the last thirty years parallel with the development of China as a superpower. However there is a lack of indigenous documentation for this historical period in many parts of the Indo-Pacific region and the process of interpretation of these voyages has been limited by the lack of an appropriate structure that accommodates traditional sources such as legends, folklore and traditional chronicles within a modern historiography based on, place names (typonomy), archaeology, multi-lingual literary sources and cartography. The resulting interpretation has therefore been vague, erroneous, socially dividing and often Eurocentric or Sinocentric.

Maps and charts are often viewed as depicting somewhat stagnant landscapes and to some extent this is true. Apart for major cataclysmic events occurring in an average life time (i.e. earthquakes, tsunamis, volcanic explosions, etc.), most geological process are comparatively slow on a human scale. However they are nevertheless in a state of flux. Political and historical events are similarly fluid. Maps and charts in the European sense are an accumulation of knowledge from various sources and containing both fact and fiction. Their interpretation has usually been based on historians, that is, people with an eye for chronology and past changes of the human landscape. Historians rely on a multitude of disciplines to enforce their story, archaeology, archives, linguistics, etc. Geographers, like historians rely on a multitude of disciplines such as, geology, meteorology and anthropology, to enforce their story of natural and human landscapes. Increasingly these two mega-disciplines are converging. Each Map or chart is the conjunction of these temporal and the spatial worlds how we interpret cartographical evidence is reliant on
these factors. So if maps reflect this conjuncture, what method do we have to investigate them? As will be evident in this paper, this was an issue in the analysis of the Western Indian Ocean portion of the Mao Kun Map over the last hundred years.

Originally thought to have been based on Zheng He’s last voyage of 1431-33, the Mao Kun map is now thought to have been produced in China around 1422-23 just before the start of the sixth voyage by cartographers using the charts from the earlier voyages into the “Western Ocean” (Huan, 1970). The map appeared in volume 240 of the Wu-bei-zhi (Defence Annals) written by Mao Yuan-i, (151-1601) the grandson of Mao Kun (Wheatley, 1975). The preface is dated at 1621, but the map was presented to the throne of the Ming Dynasty in 1628 (Duyvandek, 1948). The original edition contained 40 pages of nautical maps and two pages of astronomical charts and was entitled “The map of setting sail from the Baochuan shipyard, putting out to sea at the Longjiang Pass and going directly to foreign countries”. The 5.6 metre (18.36 feet) map was printed horizontally (i.e. a cartogram) consisting of a series of folios 20 centimetres (8 inches) high numbered from 2V to 22, reading from right to left (i.e. the direction of sailing) with China at the extreme right and Africa/Arabia at the extreme left (Feng Ch’eng, 1970).
The first western historian in the twentieth century to have suggested that the Chinese had sailed to East Africa was Captain C. H. Stigand (Stigand, 1913). The first Chinese study into Sino-African historical references and relations was entitled "Chung-His chiao-t’ung shih-liao hui p’ien" and was conducted in Beijing in 1930 by Chang Hsing-Lang. In 1947 the Dutch sinologist J.J.L. Duyvendak presented two lectures at The University of London. Duyvendak addressed the topic of the Chinese discovery of Africa and presented the known information on Zheng He’s voyages and the Mao Kun map (Duyvendak, 1948). All subsequent historians acknowledged the map as evidence of one or more of Zheng He’s voyages. The information in the Mao Kun map is accompanied by a book compiled by Ma Huan called the Overall Survey of the Ocean Shores (Huan, 1970). Note that none of these people knew anything about East African history or had actually been there.
For over a century two questions had been constantly asked; where in Eastern Africa did the Zheng He voyages reach, and if they did; what is the relevance of the Zheng-He’s voyages to African history? The reasons for these questions are numerous and in the main, originally related to the colonial and imperial rule of Africa in the first half of the twentieth century and the need to find non-indigenous ownership for African material culture, from the ruins of Zimbabwe to the Swahili towns of the coast. African studies were never considered or consulted in this period. In the last sixty years the interest has come mainly from China and has been accompanied by China’s political and economic activities in Africa, especially in Tanzania and Mozambique.

The first doubt on the representation, interpretation and therefore authenticity of the Mao Kun map was made by James Kirkman in an unpublished manuscript in 1966. Kirkman doubted that the Folio 19V and 20 actually represented the coast of North-eastern Africa including Malindi (Martin, 1973). In 1969 the Mao Kun map was presented as part of a paper by Dr. Kuei-Sheng Chang, the Chinese Associate Professor of Geography from Washington University (Seattle, USA) at the Third Conference on the History of Cartography at Brussels. Chang’s paper was entitled “Africa the Indian Ocean and China in the Fourteenth and Fifteenth Century”. In his paper, Dr. Chang identified several places on the East African coast, including from north to south; “Mogadishu, Brava, Mombasa and Malindi” (Chang, 1970). The position and relative distances of Mogadishu, Brava and Malindi are correct. However Dr. Chang translated the name of a place to the north of Malindi as Mombasa which would be geographically incorrect. No detailed identification of the other places were made though they were transliterated (Pereira, 2012). As a result the nineteenth century port of Lindi in Southern Tanzania subsequently came to be regarded as
the “Malindi” of the Mao Kun Map, and eventually the map was thought to represent the entire East African coast from Somalia to Mozambique.

These two widely differing interpretations are the basis of maps, murals, sculptures in museums all over Asia, as well as in countless publications across the globe. One suggested a distance of 823 kms (512 miles) and the other of (1683 miles)!

**Methodology**

Clearly new method of interpretation was required, and so in 2010 Pereira “borrowed” a concept from the Petroleum Industry where he had worked for six years. When seeking oil (or gas) deposits, a mapping process based of geophysics is used. Hydrophones (over water) and geophones (over land) “listen” to the sound of shock waves as they reflect off the boundaries of different rock strata. This produces a vertical map or geophysical section of the earth, rather like looking at the side of a sliced layered cake. The deeper down you go, the older the rock, so this is temporal. If you have a grid of these sections you can map them, resulting in a spatial perspective or a paleo-map. However you don’t actually know what the rock type exists a kilometre below the surface. So you drill a bore hole and pull up the layers of rock in a core, and you correlate these actual rock types to the section, and the paleo-map. With this you can actually map past surfaces or paleo-landscape. This process is a marriage of temporal and spatial data, which is then reinforced with factual exploration. Maps and charts represent precisely this conjuncture of time and place and to understand them they need archaeological, archival, linguistic, oral-history and even genealogical facts. Pereira method was to break the data needed to investigate the Mao Kun map into four steps, the first of which is cartographic, and is equivalent to the geophysical sections. The second and the third are equivalent to the geological core
samples, and the final collation is the culmination and testing of the process.

The first step was cartographic place name (or toponymic) collation. This involved listing all of the localities on the Mao Kun Map and any contemporary archival evidence. In this case toponyms from two inscriptions found in China in 1935 and 1937 and the descriptions made by the Chinese traveller Fei Xin (Duyvendak, 1948) were included. Additionally an account of the official secretary of the Zheng He voyages, Ma Huan (born around 1380) was added. The original book has not survived but three printed versions exist (Huan, 1970). A list of transliterated toponyms was produced in the pin-yin Latinised version of Chinese. This standardised the phonetics and made comparisons with Arabic and Swahili easier. The result was an early fifteenth century index of African, as well as Maldivian places names and some indication of their latitudes based on Chinese li measurements. Arabic maps from the ninth to the fifteenth century were consulted and a similar toponym list was produced, for the same region. Finally maps and archival material from Portuguese sources in the sixteenth century and seventeenth century were consulted to produce a list of Portuguese toponyms also for the same region of Eastern Africa. This concluded the cartographic toponym collation. There were now four sets of names of places; the modern (i.e. English) ones, the Arabic ones, the Chinese ones and the Portuguese ones. Since East Africa has a North-South coast the toponyms were placed in order from North to South.

The second part involved adding archaeological evidence. Since the 1960’s a great deal of archaeological work has been conducted in Eastern
Africa, both terrestrial and marine, and thanks to local historians there is clear understanding of the size and nature of hundreds of sites. For this research, only sites known to have been in existence in what local historians term the Period III – The Islamic Period (1100-1500AD) and especially those over 2.5 hectares with stone buildings were considered. Since the Mao Kun Map is a navigational chart, care was taken to include those settlements with harbours (Abungu, 1994).

The third step of the process was based on the region and its indigenous historical sources. In this case the Swahili (or Kiswahili) and Somali (or Af-Soomaali) toponyms were recorded for all existing places and archaeological sites along the East African coast identified from Step 2. Local, archival histories, chronologies and linguistics provided a wealth of information on the origin of toponyms. They also inferred changes in place names over time, which are especially useful for dating maps.

The fourth step was the final collation of this evidence. The lists were places in a chronological order from left to right (archaeological, Swahili toponyms, Arab toponyms and Portuguese toponyms). Within the list the toponym were geographically listed from north to south, and finally the Chinese toponyms were simply placed between the Arab and Portuguese ones. Straight away the identity of the Chinese toponyms became obvious. But more detailed site-by-site multidiscipline investigations were made of all the identified localities (Pereira, 2012).

Results
Table 1 Kiswahili/Somali, Arab, Chinese and Portuguese toponyms (Pereira, 2012).

<table>
<thead>
<tr>
<th>English names</th>
<th>Archaeological Sites</th>
<th>Somali and Kiswahili names. From linguistics, chronicles and oral history.</th>
<th>Arab names (From 9th to 15th Century AD literary sources)</th>
<th>Chinese names (From the Mao Kun map and Fei Xin text in pinyin)</th>
<th>Portuguese names. (From sources of the 16th and 17th century)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socotra Island</td>
<td>Usukotora</td>
<td>Usqutrah</td>
<td>Xu-duo</td>
<td>Ilha Zocotara</td>
<td></td>
</tr>
<tr>
<td>Ras Hafun</td>
<td>Raas Xaafun</td>
<td>Ras Hafun</td>
<td>Ha-fu-ni</td>
<td>Cabo Dorfar</td>
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<tr>
<td>Ras Macber</td>
<td>Raas Macber</td>
<td>Murr-I-Khabir</td>
<td>Muer-li Ha-bier</td>
<td>Ras Mabbir</td>
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<td>Raas el Cheil</td>
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<td>Heier</td>
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<td>Ras Naha</td>
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<td></td>
<td>La-si Na-ha</td>
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<tr>
<td>Marka</td>
<td>Mareeq</td>
<td>Marka</td>
<td>Moer –Ganbie</td>
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<tr>
<td>Mogadishu</td>
<td>Muqdishu</td>
<td>Maqdishi</td>
<td>Mu-qu-du-shu</td>
<td>Mogadox</td>
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<tr>
<td>Marka</td>
<td>Marka</td>
<td>Marka</td>
<td>La-sa</td>
<td>Merica/Merique</td>
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<tr>
<td>Brava</td>
<td>Baraawe</td>
<td>Barua</td>
<td>Shi-la-wa/Bu-la-wa</td>
<td>Barua</td>
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<td>Juba River</td>
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<td>Nil Jubb</td>
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<tr>
<td>Juba</td>
<td>Giumba/Goob</td>
<td>Zhu-bu</td>
<td>Jugo/Djumbo</td>
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<td>Kismayu</td>
<td>Kismaayo</td>
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<tr>
<td>Bur Gaabo</td>
<td>Bur Gaabo</td>
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<td>Cavo</td>
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<td>Kiunga</td>
<td>Kiunga</td>
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<td>Lungo</td>
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<tr>
<td>Mambore/Omwe</td>
<td>Mambore/Omwe</td>
<td>Mu-lu-wang</td>
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<tr>
<td>Pate Island</td>
<td>Kisiwani Mpathe</td>
<td>Jazira al-Faza</td>
<td>Ilha de Pate</td>
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<td>Shanga</td>
<td>Shanga</td>
<td>Shaugh</td>
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<td>Siu/Syo</td>
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<td>Siu/Syo</td>
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<tr>
<td>Faza Town</td>
<td>Rasini/Mfasa</td>
<td>Rasini/Faza</td>
<td>Man-ba-sa</td>
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<td>Patee</td>
<td>Bataa</td>
<td>Pata</td>
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<td>Jazira al-Manda</td>
<td>Ilha de Manda</td>
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<td>Manda Kuu</td>
<td>Mandira</td>
<td>Mandra</td>
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<tr>
<td>Kitau</td>
<td>Kitau</td>
<td>Ras Kitao</td>
<td>Qi-da-er</td>
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<tr>
<td>Lamu island</td>
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<td>Jazira al-Sila</td>
<td>Zhe-ji-la-ha-ze-la</td>
<td>Ilha de Limon</td>
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<tr>
<td>Lamu Old Town</td>
<td>Amu</td>
<td>Al-Amu</td>
<td>Limon</td>
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<tr>
<td>Tana River</td>
<td>Khorr</td>
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<td>Rio Ozi</td>
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<tr>
<td>Ungwana</td>
<td>Hoja</td>
<td>Man-fei-chi</td>
<td>Oja/Hoa</td>
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<td>Ungwana Bay</td>
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<td></td>
<td>Bahia Formosa</td>
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<td>Ras Ngomeni</td>
<td>Ngomeni</td>
<td>Ge-duo-gan</td>
<td>Quitao</td>
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<td>Kibirikani</td>
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<td>Mambrui</td>
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<td>Quilimanci</td>
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<td>Galani/Sabaki R.</td>
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<td>Khorr</td>
<td>Rio Quilimanci</td>
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<td>Malindi</td>
<td>Malindi</td>
<td>Mulanda</td>
<td>Ma-lin-di</td>
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<td>Gedi</td>
<td>Kiliman</td>
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<td>Queliman</td>
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<td>Mnarani/Kilifi</td>
<td>Kilili</td>
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<td>Quilili</td>
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<tr>
<td>Jumbe la mtwana</td>
<td>(Name unknown)</td>
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</tbody>
</table>
The incredibly accurate voyaging directions depicted in the Mao Kun Map, suggest that the Zheng He voyages did reach Africa as inferred by all of the historians from Captain C. H. Stigand (1913). A more precise scale was produced which was actually in line with the other parts of the two folios depicting Africa. This confirmed that Ming Chinese knowledge of Africa in the fifteenth century was limited to the Northern hemisphere, and essentially no further than four degrees south of the Equator. There remains no archaeological or archival evidence to support this idea that the Ming fleets sailed further south than Malindi, or to indicate that the Ming fleets circumnavigated Africa. In fact it was the lack of publication on this research that allowed various theories to be formulated (Menzies, 2002). The Mao Kun map is not based on Western North-South and East-West compass bearings, rather it is a navigational chart based on maritime routes and presented in a linear form, which is not unusual for the medieval period. However the use of directions is based on the Eastern (Chinese, Korean, Japanese and Vietnamese) twenty-four point compass, where 1 stood for the North, 7 for the east, 13 for the south and 19 for the West.

The portion analysed by Pereira (2012) consists of four separate maps of slightly differing scale, one covering India at the top, one for the island of Sri Lanka, one for the Maldives in the middle and one for Eastern Africa at the bottom.

The revised analysis of the Mao Kun map proved beyond doubt that the maplet at the bottom of folio 19v depicts roughly 850 Kilometres (or 450 miles) of the East Africa coast as far south as Malindi. The result of this investigation was a new and more detailed interpretation of the Mao Kun map which clarified some of the points and criticism of previous analysis.

The use of the Arabic *Jazira* ("Island" in Arabic) and Kiswahili toponyms, suggests the input of Arab, Somali and Swahili individuals, whether mariners, merchants, slaves or ambassadors to the cartography of the Ming fleets (Pereira, 2012).

The known archaeology of clusters of fifteenth century sites fits the main places described in the Mao Kun Maplet for both Southern Somalia and Northern Kenya. The map identifies political spheres centred on the major medieval urban areas of the Swahili culture and this coincides with local folklore adding credence to the inferences and conclusions of many scholars (Levathes, 1994). The maplet supports the events of the Pate Chronicle, to the extent of providing valuable dates to events.

![Fig. 2: The Mao Kun Map after analysis. (Pereira, 2012)](image)
Conclusion

This most important contribution of this multi-disciplinary method has been to fill in some gaps in the chronology of East African settlements primarily in Kenya and Somalia. But this methodology lends itself to other parts of the Mao Kun map, and is presently being used to investigate the Arab-Persian Gulf and Arabian Sea portion of the map as part of a regional study on the fifteenth to seventeenth centuries. The Mao Kun map brings a different perspective on cartography and perspectives from the more familiar Portuguese maps of that period.

As part of the process the toponym study of Portuguese maps of the Arab-Persian Gulf has already identified one erroneously dated Portuguese map, confirming some previous doubts on its assumed age. It should be possible to adapt this methodology for other maps including the Seldon Map.

References

Monographs


**Collections of essays, or conference proceedings.**


**Articles in journals**


**Biography**

Clifford Pereira is a Historical Geographer specialising in ‘hidden histories’ and migrations from and within the Indian Ocean World. A graduate of Geography and Asian Studies from the University of Ulster, he is a long-term fellow of the Royal Geographical Society (with IBG), where he was also curator, consultant and facilitator on outreach projects (2006-2013). Pereira was Honorary Research Assistant with Royal Holloway, University of London (2010-2013), and Visiting Assistant Researcher for Dalian Maritime University, China (2011-2015). He is currently a Researcher on the African collection of the Museum of Anthropology (MOA) at UBC, Canada and specialist researcher and for the international heritage consultancy firm Barker-Langham, London (2008-Present).
Session 15: World War Underwater Cultural Heritage in Asia-Pacific

The Asia Pacific region contains nearly 4,000 shipwrecks and thousands of aircraft related to World War II. There are also a number of sites associated with World War I to be found in this region. The sites and associated histories, combined with the many terrestrial war heritage are a tangible and intangible reminder of the tragic nature of war. As part of their historical values, this heritage is valued and used in many commemorative services. It is also valued economically through the thousands of tourists that visit the sites and dive the shipwrecks. The sites also contain material (both on land and underwater) such as unexploded ordinance, leaking chemicals from munitions, and oil that has the ‘potential’ to damage the sites, harm visitors, and impact the marine environment.

Local people throughout the region have a number of different perspectives on these sites. They went through terrible suffering during the war, and in some cases they do not value the sites in the same way as the war protagonists. Site management which relies on the good will of local people, and local legislation and management systems may not be that effective. Recent cases of the salvage of World War II sites unbeknown to local governments highlights to some degree these different values. Effective management in maintaining the historic, archaeological and social nature of sites needs to be relevant and beneficial to local people as well as the international community.

This session calls for papers that will consider a broad discussion on site and intangible heritage values, and the relevance and benefits of researching and managing World War sites in the Asia-Pacific region.

Session Chairs: Dr. Bill Jeffery
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P-38 Lightning Aircraft Wreck in Lae-lae Waters, South Sulawesi, Indonesia

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Abstract

In 2016, Makassar Cultural Heritage Preservation Office surveyed Lae-lae waters to search for the potential of underwater archaeological remains in that area. The observation result shows the presence of underwater archaeological remains in the form of an aircraft wreck which located at 24 meters depth. The condition of the wreck is still intact with the percentage about 70%. The body of the aircraft can still be seen. The tail section cannot be observed, neither some parts of the aircraft plane, which has been lost.

A literature study has been done to compare the model of this aircraft wreck with the historical archives regarding the World War (WW) II military planes. Based on the identification result, it can be assumed that the remain found in Lae-lae waters is a P-38 Lightning, an American Lockheed fighter, that is the aircraft wreck is a twin booms and a central nacelle. It seems likely that this aircraft fell down during the battle between Japanese aircrafts versus The Allied Forces (America-British-Dutch-Australia) in WW II. When the wreck found by the survey team, it was wrapped by rope nets, that is suspected from illegal salvaging activity. The aircraft wreck site location is closed to Makassar city coastal area which has been contaminated by a high intensity of the waste from industry and household settlements. This waters are a bustling area as a sailing route and a fishing ground of the local fishermen. Those factors can threaten the P-38 Lightning aircraft wreck site’s existence of underwater cultural heritage in South Sulawesi.

An assessment regarding the possibility to relocate the aircraft wreck to Samalona Island has been also carried out. It is needed to be done in order to achieve the benefit of aircraft wreck utilization as mandated in Indonesian Cultural Heritage Laws No. 11 Year 2010. The wreck site has an important role in the development of related science, can be a learning
material regarding the WW II history and a colonialism period in Indonesia, as well as enriching the knowledge related to the technology of a fighter aircraft. P-38 Lightning can also be a dive destination which will provide a positive impact to the society.

**Key words:** Aircraft Wreck Site, P-38 Lightning, Heritage Utilization

**Introduction**

In 2016, Makassar Preservation for Cultural Properties office conducted an underwater survey in Lae-lae waters from a fisherman’s report about finding 3 bodies of an aircraft wreck. By the result of survey known that the wreck in the location was the aircraft and has 3 bodies, and the condition of wreck was about 70% of intact.

The survey was completed in seven days by using a method consisting of data collecting in the field by describing, sketching, measuring and photographing. A survey and literature study was conducted by using data collected from the internet and related websites.

When it was found for the first time, the aircraft wreck was covered by fishing net and also covered by a pile of plastic garbage from litter. So the first three days was focussed on cleaning it so that it can be well-identified. Cleaning efforts took a lot of time and energy, because the fishing net made from big rope, and the cleaning done by manual cutting.
Fig. 1: The condition of the aircraft wreck when it was first discovered (1a-1b), cleaned (2a-2b), the condition after being cleaned (3a-3b), and partly removed from the location (4a-4b).

The result of field data collecting
The results of field data collection showed that the aircraft had 3 bodies, the middle is a cockpit, it was opened and uncovered, there was no also steering or pilot’s seat in the cockpit. On the front side of the middle body there were five weapons 4cm in diameter. Then two other bodies on the right and left side of cockpit. Some parts of the right body were detached and broken down. The wings that connected the three bodies were undamaged. Right wing was covered by fishnet tightly. While the cover of the left wing has been detached, with what seemed like black tarp. On the left top there was turbo supercharger while on the right top of the body there was turbo cooling and heating air intake. Two wheels were found at the wreck. Undercarriage wheel on the right was almost detached from the body of the wreck. While the left it still was in normal condition but half
of it was buried in the mud. Unfortunately, the tail which linked the left and right body was unseen. (Andriany, Dkk. 2016).
The last day of survey we took a sample of ammunition from the magazine about 20 mm of its’ size, also we lifted a part of wreck which half round with thick; 27 mm, width; 57cm, and height; 37.5 cm that was found separately from the wreck body. The lifting was to secure the object from the possibility of illegal lifting. Based on identification result, the object was known as a radiator from the right wing.

![Diagram of aircraft parts](image)

*Fig. 2: The parts of the aircraft wreck lifted.*

**Result of literature data collecting**
The result of field data the compared with literature study about the three bodies in the aircraft it was known as P-38 lightning made by Lockheed America and produced in 1939. This aircraft was used in World War II. The shape of this aircraft consisted of a central nacelle in the middle and body on left and right wings that functioned as twin bombs. The central
The nacelle consisted of a cockpit and armory of four machine guns and a cannon, and a front landing gear. While the body of twin bombs had machines inside; a landing gear and rudder. Both twin bombs were united with an elevator at the tail (http://www.rumahmokit.com). Besides, after doing first conservation by cleaning the radiator that was lifted up from the location, the information found which strengthened the assumption that it was a P38 Lightning. At the radiator written down the number, type of aircraft, empty capacity, fuel and the country of company where the aircraft made. Writings on radiator flat shown the type of aircraft was Lockheed P 38 Lightning H series. Even the plate radiator shown that the wreck was a Lockheed P Lightning H series, but BPCB did not conclude directly, it was caused literature said that the written series of the aircraft did not guarantee that the series of the aircraft which buried in Lae-lae waters. A note of Disassembled and Reassembled Pacific wrecks said that this was usual where the radiator of an aircraft installed into another one as long as it was still the same type, moreover the radiator of the P38 Lightning can be installed into other types, especially when in an emergency. The other data revealed that the aircraft which was used in the Pacific War was sent piece by piece then reassembled at the air base destination. According to the official website “Pacifikwreck” most of victims of war of P-38H series were in Iran waters, Papua New Guinea and Australia, and no one of that type were lost in Sulawesi waters. (www.pacificwreck.com)
**Historical background**

The P-38 Lightning is an aircraft of the American Air Force that was made by Lockheed and used in World War II as its heavy fighter and multi-role. It was produced in 1939 for the first and developed by the requirements of American Air Corps then has several variants of series. The aircraft consists of central nacelle with cockpit and armory, and twin bombs on the left and right side. Actually, Lockheed Lightning P-38 was involved in European theatre in World War II but the cold weather was not suitable for this type. Finally, it was diverted into Pacific War where the area had tropical climate.

Getting involved in Pacific War, P-38 had the important role in air control at war locations. The role was as spy, companion, bomber, and hunter. Because of its greatness this type of aircraft got several names, allies named it by the fork-tailed devil, der Gabelschwanz-Teufel oleh Luftwaffe Jerman dan "two aircrafts, a pilot" (2飛行機、1パイロット Ni hikōki,
ippairotto?) by Japan. (www.wikipedia.Lockheed_P-38_Lightning). One of its great achievements was shooting down the bomber Mitsubishi Betty, one of the leading Japanese aircrafts attached to Japan’s General Isokoru Yamamoto, he was a genius general he was a strategist who took a part in attacking Pearl Harbor.

The “Pacific Theatre”, is a great story of great battle between America’s allies that called ABDA (American, British, Dutch and Australia) and Japan, and the climax of this battle in 1942. It began with surprise attack to America’s air force in Pearl Harbor by Japan on December 1941. Then Japan attacked America’s Air Force in Luzon Island Philippines from Iwo Jima, this indicated the beginning of World War II in the Pacific Front. Allies called it Pacific Theatre, while Japan called it War of Great East Asia. It was called the Pacific Front because the battle was in Pacific Ocean and around, in the area of East Asia and Oceania.

Indonesia became a separated area in the Pacific Theatre, because Indonesia is located between the Indian Ocean and the Pacific Ocean, and borders Australia in the south and Papua New Guinea in the east, where air bases of America where in Australia, Papua New Guinea and the Philippines. Besides, Japan indicated Indonesia as the conquered area because it is in strategic location, because Indonesia has many resources that supported the war. After conquering the American’s air base in Philippines, Japan then conquered Indonesian islands one by one. It began on January 1942, Japan occupied Sulawesi and Timor, and followed by occupying mineral resources and refineries which were vital for war necessity, which are Tarakan, Balikpapan, and Kendari then Banjarmasin, Ambon, and Palembang. On middle of March whole area of Southeast Asia had been occupied by Japan, then great battle happened in the note of allies the battle called by ‘the Battle of Java Sea’³, the battle
between allies and Japan in Java Sea and Japan won this battle, then the allies got rid from the archipelago of Indonesia.

June 1942 was the first revenge of America; it was begun by appointing Douglas McArthur and Chester Nimitz to lead the allies’ troops on the Pacific Front. The battle began in Midway Island. In this battle, both Japan and Allies made aircrafts and aircraft carrier as the main weapon. In this battle Japan lost some of their best pilots and their aircraft carriers. Based on the result of identification which did by American side, there were 78,750 troops lost in the Pacific War. The cause of the lost was bombing into the aircraft carriers, while aircraft carriers brought thousands of crew and troops. The landings on the aircrafts also took many victims from the American side in Solomon Island, Guadalcanal until Iwo Jima Japan and some places also took victims from American side.

Specifically Pacific wrecks has been said that P-38 aircrafts were lost when operating in the waters of Sulawesi (15th of October 1944), one of them operated by Captain Kenneth G. Ladd (nicknamed: Nulli Secundus) from squadron 36, group 8, troop 5, which had been revealed lost (MIA: Missing in Action). Ladd was on a mission to escort B-24 Liberators from Australia to Balikpapan, on the way the plane was intercepted by Ki-44 Tojos, according to the testimony of one of the B-24 crew, Ladd tried to divert the enemy by turning the plane and finally being shot in the tail and fell in the Makassar Strait. In another literature mentioned, the other missing plane in Makassar Strait is Lockheed P-38 under the name of pilot Lieutenant Colonel Robert B. Westbrook, who did not return while performing his duties to the Makassar Strait. The type of aircraft used is the P-38J. The pilot in charge of USAAF (The United States Army Air Forces) 13th Air Force, 347th Fighter Group, 339th Fighter Squadron mission run on 22 November 1944 taking off from Middleburg airfield (north coast of Papua New Guinea) for the task of attacking the Japanese
base in Celebes (Sulawesi). The aircraft was shot and crashed after being bombarded by about 140 Japanese warships in the port of Makassar on the western side of the island. Lieutenant Colonel Westbrook was officially declared dead on that day as the mission was carried out. The names of Laad and Westbrook are then immortalized on the book sheets for missing persons in Manila American Cemetery (American MIA at Pacific Theater War) (Andriany, et al., 2016)

Makassar Strait becomes the battle zone, some great battles either directly or indirectly around these waters. The history of the battle is then proved by the existence of some archaeological remains in the form of several warships found in the Makassar strait, especially the waters around the city of Makassar. The archaeological findings are Japanese naval shipwrecks in Samalona waters, Japanese naval shipwrecks in Kodingareng Keke waters, where sites have been surveyed by BPCB Makassar both, as well as some fishermen information about the findings of an aircraft wreck that BPCB has yet to discover.

![Map of underwater cultural heritage sites](image)

*Fig. 4: Underwater Cultural heritage sites from colonial period in Makassar waters.*
Geography

The Lockheed P 38 Lightning aircraft wreck was found in the Waters of Lae-lae, at 24 meters depth. This location belongs to the territorial waters of spermonde zone\(^5\) Makassar Strait, the location of the survey is about 2.6 nautical miles from the coastline of Makassar, located on the southeast side of Makassar port and located in the western position of Fort Rotterdam\(^6\). It is close to the city of Makassar and many inhabited islands in the vicinity, so in this area there are many maritime activities, among others as an inter-island shipping lane, as a fishing area, as anchored areas of large tonnage container vessels who want to dock at the harbor of Makassar moreover.

The city of Makassar topographical condition take influence to Lae lae waters, where the waters are flooded by two mouths of the Tallo River which empties into the north and Jeneberang River which empties into the south. Throughout the coastal area of Makassar city which is facing directly with these waters there is a row of hospitality and restaurants that throw their waste into the sea, it also gives impact to the surrounding marine environment. Based on observations at the time of the survey, the cross section of the waters consists of a sand plane lined with mud-like sediment. No coral reefs that grow on the surface of the seabed, especially in environments where the wreckage is found. Whitten (1987) says that waste discharged into the sea, solid boat traffic, can adversely affect to ocean ecology, this can be seen in the topography sea floor in the form of bare sand.

Lae-lae Island and Samalona Island are the closest toponyms to the site, the site's location is located between the two islands. Lae-lae Island has an area of 6.5 hectares of acre with a population of over 400 people where most of the population is a fisherman. While Samalona Island covering an area of 2.34 hectares are only inhabited, approximately 16 family head,
Samalona Island has become one of the marine tourism destinations in the city of Makassar, white sand with clear waters with underwater panorama of coral reefs and colorful fish. And the sloping sea floor contours, making it ideal as a dive diving spot. Some diving training has also chosen this island as the location of diving practice.

**Underwater Cultural Heritage Management**

The Indonesian government preserves the cultural heritage based on Law Number 11 of 2010 on Cultural Heritage. In the regulation, cultural heritage is intended as a cultural heritage with a definition of "cultural heritage of material objects of Heritage, Heritage Buildings, Heritage Sites and Cultural Heritage areas on land and in water that need to be preserved because it has an important value for history, science, Education, religion, and/or culture through the process of determining"\(^5\). Furthermore, cultural heritage as regulated in Law Number 11 of 2010 is that fulfill the following criteria:

- a) Aged 50 (fifty) years or more;
- b) Represents the shortest style of age 50 (fifty years);
- c) Represents a special meaning for the history of science, education, religion, and/or culture;
- d) Has a cultural value for strengthening the nation's personality

Indonesia cultural heritage preservation in law mandates strictly "that Cultural Heritage is a cultural richness of the nation as a manifestation of human life and thought which is important for the understanding and development of history, science and culture in the life of society, nation and state. So it needs to be conserved and managed properly through protection, development and utilization efforts in order to promote national culture for the greatest prosperity of the people".
This aspect indicates that the Lockheed P 38 Lightning aircraft wreck meets the criteria as a cultural heritage landmark that must be preserved\(^6\) based on the concept of preserving the cultural heritage in Indonesian cultural heritage law. Given to the important value of the underwater heritage of Lae-lae sites, it is the require BPCB to conduct a survey on the P 38 Lightning aircraft wreckage site in Lae-lae waters. Survey is the first step in preserving the cultural heritage which is one of the forms of protection and save the cultural heritage. Survey is a method of work in collecting data including observation of archaeological remains in the field accompanied by in-depth assessment and analysis, as well as gathering information through interviews to residents or tracking news in the literature. The purpose of the survey is to obtain data about newly discovered objects or sites. From the results of this survey then came the recommendations that contain about what plans should be applied to the object concerned. (Simanjuntak, et all, 2008)

The results of the identification and assessment to the condition of the wreck of the P 38 Lightning and environmental conditions in the survey were indicate the level of threat. When it was first discovered in a tissue-packed condition suspected of being an illegal salvage activity, and the assumption that the possibility of the aircraft wreck is already undergoing in site transformation, due to the illegal salvage effort, this assumption is reinforced by interviews mentioned by Andriany (2016) with fishermen who work as seekers and collectors of scrap metal from shipwrecks in the ocean, who claiming that they had tried to lift the aircraft wreck.

In addition to these issues, hotel and restaurant waste has been exacerbating the condition of the aircraft wreck and has accumulated on the body of the aircraft, this can be observed directly at the time of survey. These muddy of the waste will burdening the body frame of P 38 Lightning, for the continuously time it can made of cause of the structure of
the aircraft wreck to collapse. Safeguards and saving efforts will be carried out gradually, the effort is to think how to divert the flow of mud and litter, by way of making a barrier around the aircraft wreck environment, and the worst thought and consideration of moving it to another location. Such efforts will begin with an assessment of various related aspects. Based on Indonesia law of cultural properties protection mandated, about utilization of the cultural heritage for benefit in order to prosperity of Indonesian society, BPCB Makassar will seek for the development and management of underwater heritage effort gradually. The recommendation of the results of the previous survey, hinted to make a follow-up to this P 38 Lightning aircraft wreck site therefore. The aircraft wreck can be utilized as a means of science development especially related to archeology, history and aviation, especially for fighters. Moreover, the fighter aircraft wreck can be a plus-point dive spot, as found in some popular dive spots in Indonesia that make underwater archaeological remains as its selling such as USAT LIBERTY dive spot in Tulamben Bali, Bomber B-24J Liberator dive spot in Togean, Tomini gulf Central Sulawesi, and dive spot Shofie riehmerk on Pulau We Aceh. This utilization by itself will have a positive impact in terms of benefits earnings to local governments in general and in particular increasing economic prosperity in the surrounding communities. And automatically the direct beneficiary community will participate in preserving the cultural heritage of the underwater.

Endnotes:

1. Cultural Heritage Preservation Unit or Balai Pelestarian Cagar Budaya (Balai Pelestarian Cagar Budaya/ BPCB) are official unit of Directorate of Cultural Properties and Museums under Ministry of Education and Culture that have functions and duties, as; (1) carries out the maintenance, management and utilization of ancient or immovable
heritage as well as underwater archaeological sites; (2) protecting of ancient or immovable heritage as well as sites including those in the field or stored in the room; (3) Implement documentation of ancient or immovable heritage as well as sites including those in the field or stored in the room; (4) Carry out investigations and safeguards against ancient or immovable relics and sites including those in the field or in the room. There are 12 units of BPCB working area in Indonesia. One of them is BPCB Makassar, having offices in Fort Rotterdam with working area covering South Sulawesi Province, Southeast Sulawesi and West Sulawesi.

2. Nusantara is a synonym for mentioning the entire archipelago in Indonesia, Nusantara first appeared in “sumpah palapa” patih Majapahit kingdom that is Gadjah mada, which was then revived by Ki Hadjar Dewantoro to replace nederlandsch indie (legenda nusantara.wordpress.com). The name of Indonesia was first introduced by James Richardson Logan in 1850 through his article The Ethnology of the Indian Archipelago, in the Journal of the Indian Archipelago and Eastern Asia vol IV. The name of Indonesia was first used in 1928 on the youth affair. And the Indonesian name was officially declared and used on 17 August 1945 at the time of the proclamation of independence of the Republic of Indonesia. (Wikipedia; sejarah nama Indonesia)

3. The Spermonde zone is located in the southern of the Makassar Strait, consisting of islands and barrier reefs that are divided into four zones. The first zone are the most shallow zone, parallel to the coastline with a maximum depth of ± 20 meters and most of the reefs are dominated by sandbanks. The second zone starts from ± 5 km from the coastline with a of ± 30 meters depth with most of the reefs are on the side of the islands that appear. The third zone starts from 12.5 km to the offshore with a of ± 30-50 m depth exposure and generally the reefs are in deep exposure with very little sand dunes found. The fourth zone or outer zone or barrier reef zone starts from a distance of about 30 km from the coast of Makassar. The eastern part can reach a depth of 40-50 m, while the western part of this zone has a drop-off contour to a depth of more than 100 m. (Sumardjito.blogspot). Derivation of The Spermonde term is from the Dutch word meaning sperm, first given by Van Vuuren a marine biologist from the Netherlands in 1920, saw many clusters of islands and gusung that spread and look like Sperm. (Andriany, et al., 2016)

4. Fort Rotterdam is the place where BPCB Makassar is have an office. In the days of colonialism, Fort Rotterdam was a Dutch fortress. It was Built in 1545 by the 9th Gowa king I manrigau Daeng Bonto Karaeng Lakiung Tumapa'risi ‘kallonna. The original name of this castle is the
bastion of Ujung pandang, often called by the local community as a benteng panynyua because its shape resembles a turtle. Taken over by the Dutch in 1667 based on the contents of the agreement Bungayya. Governor-General Cornelis speelman later renamed this fort to Fort Rotterdam as the name of his city of birth, some of the buildings were then rebuilt with Dutch architecture. (Wikipedia.Fort Rotterdam)

5. The decree definition in Indonesian law of cultural properties is the granting of cultural heritage status to objects, buildings, structures, locations or geographical space units undertaken by the district / city government on the recommendation of a team of cultural heritage experts.

6. Preservation cultural heritage concept is, a dynamic effort to maintain the existence of a cultural heritage and its value by protecting, developing and utilizing. Protection is the effort to prevent and cope from damage, destruction, or destruction by means of rescue, security, zoning, maintenance and restoration of cultural heritage. Development is the enhancement of the potential value, information and promotion of cultural heritage and its utilization through continuous research, revitalization and adaptation and not contrary to the purpose of preservation. Utilization is the utilizing of cultural heritage for the maximum benefit of people’s welfare while maintaining its sustainability.

7. Indonesian law of cultural properties protection namely Undang-undang Republik Indonesia Nomor 11 Tahun 2010 tentang Cagar Budaya.

8. Survey is one of the stages in cultural heritage protecting effort.

References:


Biography

Andriany is an archaeological analyst for archaeological relics at Makassar Cultural Heritage Properties Office in the Directorate of Cultural Properties and Museums for Ministry of Education and Culture. She is responsible for the underwater cultural heritage exploration. She was awarded with a Bachelor of Archaeology at Hasanuddin University (2001), and a Magister of Science of Anthropology at Hasanuddin University (2016). Her non-formal education includes cultural heritage safeguarding particularly on underwater cultural heritage held by Indonesia both nationally and internationally. She recently has become a scout coach on cultural issues. Andriany has attended the ASEAN workshop on alternative solution and extended frontier (2016) held by Thailand and was a speaker in an International symposium on past, present and future of ASEAN maritime heritage, recently in Bangkok. Some of her articles have been published in a bulletin have as an underwater cultural heritage management theme.
“Ghost Battleships” of the Pacific: Metal Pirates, WWII Heritage and Environmental Protection

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Abstract

In recent times, the remains of World War II (WWII) warships have increasingly vanished from the Pacific seafloor causing a serious dilemma in underwater heritage preservation and environmental protection. It is alleged that the remnants of American, Australian, British, Dutch and Japanese warships have largely been the victim of ‘metal pirates’. This paper highlights the particular threat posed to sunken WWII ships from metal pirates, who, unlike traditional treasure hunters, have specifically targeted ships’ fixtures and fittings, bronze propellers and metal hulls, and in some cases, even unexploded ordnance. Besides the impact on heritage conservation and integrity, the actions of metal pirates are posing a significant threat to the marine environment, particularly given that many WWII wrecks to this day still contain considerable quantities of oil, unexploded ordnance and ammunition. The illicit salvaging of WWII wrecks has the potential to cause the release of oil and toxic chemicals into the surrounding marine water resulting in the contamination of fishing grounds, so threatening the wider environmental security of the Asia-Pacific region. Indeed, as the legacy of the Pacific conflict is represented by the number of warships that rest on the seafloor, there is the potential for serious environmental harm to occur unless States cooperate with one another to prevent piracy and related maritime crime. Many WWII wrecks are historically significant, such as the USS Indianapolis, sunk in 1945 after delivering components of the atomic bombs to Tinian; while others, such as Australia’s HMAS Perth, serve as war graves to their crew. As such, this paper considers the challenges States face in protecting sunken battleships from metal pirates who prey on the remnants of war.

Key words: WWII shipwrecks, South China Sea, metal pirates, environmental security, unexploded ordnance
Introduction

The naval battles of the Pacific conflict (1941-1945) occurred over a wide ocean space. The focus of this paper is on the South China Sea area. The waters around Indonesia, Singapore, Malaysia and the Philippines contain the remains of hundreds of WWII shipwrecks (Andrews, 2016; Dockrill, 2016). The Battle of Leyte Gulf, which was the greatest naval conflict since the Battle of Jutland (1916), was fought in waters near the Philippine islands of Leyte, Samar and Luzon in 1944 (Friedman, 2001: 395; Sears, 2005: xv). Another battle of similar significance was the Battle of the Java Sea which pitted the American-British-Dutch-Australians against their Japanese rival on 27 February, 1942 in the waters of Indonesia (Morrison, 1948: 358; Madison 405). The aftermath of the battle included a series of smaller naval actions, including the Battle of the Sunda Strait. Today, many of the sunken vessels serve as the final resting place for thousands of Allied sailors and Japanese servicemen killed during the Pacific conflict.

In recent years, sunken WWII warships have been increasingly disappearing from the seafloor of the South China Sea area. Although investigations are ongoing, most experts believe that the principal suspects are metal pirates (Metcalfe, 2016). For instance, Australia’s HMAS Perth, located off Java in Indonesia, has had 60 percent of its hull stolen by illegal salvagers (Australian National Maritime Museum, 2017). The HMS Repulse and HMS Prince of Wales, which were sunk by Japanese aircraft off the coast of Malaysia in 1941, have also fallen prey to illicit salvage crews operating in Asian waters. Additionally, three Japanese WWII cargo ships, collectively known as the Usukan wrecks, which sank off the coast of Borneo in Malaysian waters in 1944, have all been looted for their scrap and precious metals (Geraldine, 2017).
The illicit dismantling of sunken WWII battleships on the seafloor represents a new challenge in the *in situ* preservation of historically significant military wrecks. This paper contends that sunken WWII vessels are culturally significant and should be valued for more than the re-sale price of their metal parts. These historically significant wrecks record a time of global conflict and cataclysm on a scale never before witnessed by humanity. WWII wrecks also form a valuable source of undocumented knowledge of the Pacific conflict. Moreover, in many instances, WWII wrecks represent a physical and spiritual place for nations to recall both pride and grief, and not least, they act as a tangible link to the past.

WWII wrecks, albeit constituting underwater cultural heritage, can be a risk to the marine environment. Indeed, the illicit activity of shipbreaking by opportunistic marauders and organised criminal groups operating in Asian waters is a serious threat to the well-being of the underwater environment. Unlike traditional treasure hunters, metal pirates target the metal hulls of wrecks, including the aluminium, bronze and steel structures of vessels. However, it is not uncommon for WWII shipwrecks to contain cargo oil, military weapons, unexploded ordnance, chemical warfare agents and other toxins such as mercury and lead (Forrest, 2012: 80; Masetti and Calder, 2014: 138; Monfils *et al.*, 2006; Rogowska *et al.*, 2010). Therefore, the use of explosives by metal pirates to rip open sunken vessels constitutes a serious pollution threat to the South China Sea area’s rich fishing grounds and fragile coral reefs, including the region’s mangroves and seagrass ecosystems.

**The Defined Region**

The South China Sea is a semi-enclosed sea in the western Pacific, encompassing an area of appropriately 3.5 million square kilometres (South China Sea Arbitration 2016: 1; Gao and Jia, 2013: 99; Morton and
The area is sometimes referred to as the ‘Asian Mediterranean’ (Morton and Blackmore, 2001: 1236). The coastal population in the region is predicted to reach 726 million by the year 2025 (Gao, 2005: 330). Population growth is highest in coastal areas of Cambodia, Indonesia and Malaysia (UNEP, 2005: 21).

The South China Sea is bordered by Brunei, Cambodia, China, Indonesia, Malaysia, the Philippines, Singapore, Taiwan, Thailand and Vietnam (Elferink 2001:170–171; Huang et al. 2015: 157). Accordingly, the South China Sea States display an extensive array of socio-political systems, from constitutional democracies (Malaysia, Philippines, Indonesia, Singapore), and social-democratic republics (China and Vietnam) to Sultanates (Brunei) (UNEP, 2005: 24). All these States are parties to leading international legal instruments pertaining to the marine environment and ocean governance. For example, most South China Sea States have ratified the Conservation on Biological Diversity¹; the United Nations Convention on the Law of the Sea (UNCLOS III)²; the International Convention on Prevention of Marine Pollution from Ships (MARPOL)³; and the World Heritage Convention⁴. As of July 2017, only Cambodia has ratified the 2001 Convention on the Protection of the Underwater Cultural Heritage.⁵

The South China Sea is a strategic commercial shipping lane linking the Indian Ocean to the Pacific through the Malacca Straits (Chiu 1977: 744; Gomez 2001: 206). Its waters contain a plethora of marine life, and its seamounts are rich in genetic biodiversity and pelagic life. These large seafloor elevations are hotspots for genetic biodiversity and hold fishery resources of increasing commercial value (Morato et al. 2010). The South China Sea is home to a highly biodiverse coral reef ecosystem and is believed to hold substantial oil and gas resources (Ba, 2011: 270;
Capener 1980; Cordner 1994: 61). As a consequence of the region’s large quantities of hydro-carbons, it is sometimes proclaimed as a ‘second Persian Gulf’ (Keyuan, 2009: 80).

The South China Sea is also a geo-politically contested maritime space (Buszynski, 2003: 346; Schofield, 2016: 344). Its waters, for instance, contain the disputed Spratly and the Paracel Islands (Odgaard, 2001). Another contested maritime structure is the Scarborough seamounts (Schofield, 2016: 343). Although these seafloor elevations are mainly rocks, reefs, shoals, and sandbanks (Beckman, 2013: 143), they are nonetheless regarded by many coastal States as strategic, economic and political assets (Joyner 1998: 197). As a result of competing sovereignty claims over these small, sparsely populated or uninhabited islands in the South China Sea, coastal States have faced challenges in implementing effective regional cooperation strategies to safeguard the shared marine environment (Joyner, 1998: 194; Vu, 2014). In other words, the lack of agreement among States concerning the delimitation of the seabed of the South China Sea and related sovereignty issues complicates maritime enforcement, and thus, can lead to unimpeded illicit maritime activities (Rosenberg, 2009: 54).

It is in this often volatile arena of ocean politics, increasingly characterised by State assertion of jurisdiction over offshore waters and natural resources, which WWII wrecks reside. The result is that underwater cultural heritage in the South China Sea area must compete against an array of State priorities relating to ocean governance. Pertinent examples include: maximising economic growth, ensuring energy security, and safeguarding national security and maritime interests.
A Threatened Heritage

In late December 2013, controversy engulfed the Australian Commonwealth government regarding its failure to act in regard to the protection of the wreck of *HMAS Perth*, located in the Sunda Strait in Indonesia’s territorial waters. The Australian public were outraged on learning that the vessel had been significantly looted for its scrap metal, knowing that the site was the resting place of seven hundred servicemen. The commentary in the media, directed towards the Australian and Indonesian governments, suggested that Australian people and the wider international community valued *HMAS Perth* for its historical significance, not least, the sanctity of the site. The general unease felt by many people, communities and governments at the prospect of allowing scrap metal scavengers to rummage through human remains in their efforts to pillage metal from military vessels is testimony to the legacy and symbolism of these ageing vessels.

In March 2017, maritime archaeologists from the Australian National Maritime Museum and the National Research Centre of Archaeology Indonesia/Pusat Penelitian Arkeologi Nasional (ARKENAS) conducted a dive on the wreck of *HMAS Perth* (Topsfield, 2017). The 2017 research dive was the first specified site assessment since 2014, following the disturbing discovery the previous year that *HMAS Perth* had been vandalised (Topsfield, 2017). The purpose of the dive was to confirm the condition of the Australian vessel, including whether the site had been recently disturbed by salvagers. In June 2017, Kevin Sumption, the Director of the Australian National Maritime Museum, advised that the diving team ‘discovered sections of the Perth missing’ (The Guardian, 2017). The Director of ARKENAS, Made Geria, said, “The National Research Centre of Archaeology Indonesia will always support the
primary purpose of this project, which is to secure formal protection for the site of *HMAS Perth*, and to develop knowledge for the management of underwater cultural heritage in Indonesia” (Naval Today.Com, 2017). Furthermore, during the Indonesian president, Joko Widodo’s state visit to Australia in February 2017, the Australian and Indonesian leaders ‘reaffirmed their commitment to work together to strengthen cooperation in the area of maritime cultural heritage’ (Joint Statement Between Australia and the Republic of Indonesia, 2017). Undoubtedly, the ongoing cooperation between Australia and Indonesia is an important step in monitoring and preserving what remains of *HMAS Perth*.

The looting of *HMAS Perth* is not an isolated incident (Farmer, 2016). American, British, Dutch and Japanese WWII warships have all fallen victim to metal pirates. For instance, in late 2016 the Netherlands Defence Ministry confirmed that the wrecks of two of its warships, the *Java* and *De Ruyter*, which had been sunk during the Battle of the Java Sea in 1942, had been removed in their entirety from the seafloor; while a huge section of a third vessel, the destroyer HNLMS *Kortenaer*, was also missing (The Guardian, 2016). The shocking discovery was made by an international expedition which visited the site in preparation for the 75th anniversary of the Battle of the Java Sea (Michael, 2016). The Guardian (2016) reports that ‘while sonar shows the imprints of the wrecks on the ocean floor, the ships themselves are no longer there’. However, the physical size of the missing ships, together with their ocean depth and distance from land, has left some experts in the field of shipbreaking questioning whether it was even possible to wholly remove a sunken battleship from the seabed (Andrews, 2016; Watson and Quiano, 2016).

The *USS Perch*, a 71 metre American submarine is also missing from the seafloor. It too is believed to have been illegally salvaged by metal pirates.
The *USS Perch* was scuttled by its crew in March 1942 after sustaining heavy bombardment by Japanese surface ships. At the time of its discovery in 2006, the submarine was intact. The *US Houston* (CA 30), located in the Sundra Strait, has also been significantly vandalised by metal pirates, however, the wreck is still mostly intact. Apart from rummaging through the wreck in search of wartime relics and premium metals, looters have pillaged unexploded shells and ordnance (Watson and Quiano, 2016). Over a thousand sailors were on board when the *US Houston* was torpedoed during the Battle of the Sunda Strait in 1942 (Morrison, 1948: 370).

Royal British naval vessels looted for scrap metal include: the *HMS Encounter*, the heavy cruiser *HMS Exeter*, and the *HMS Electra*. These three British vessels were lost over two days during a series of battles with the Japanese navy in February 1942. Similar to the fate of many WWII wrecks, the British destroyer *Electra* suffered the indignity of having its colossal bronze propellers stolen by metal scavengers (Watson and Quiano, 2016).

Another example of metal piracy and undersea looting is found off the coast of Singapore. The British battleship *HMS Prince of Wales* and the battlecruiser *HMS Repulse* were sunk by Japanese land-based planes on 10 December 1941. Today, these two historic wrecks have had their bronze propellers stolen and their engine rooms looted for premium metals (Ryall and Guner, 2014). In addition, the wrecks’ outward appearances are marred by loose plating and missing rivets, and their metal hulls show extensive damage such as large intrusions and the peeling back of steel plating. Disturbingly, salvage debris around the site indicates that ‘coffee tins were packed with explosives by the scavengers and forced into cavities in the vessels’ hulls’ (Ryall and Gunter, 2014).
In early 2017, the remains of the Japanese cargo vessels, the *Kokusei Maru*, the *Higane Maru* and the *Hiyori Maru*, all located off the coast of Malaysia’s Sabah state on the island of Borneo, were salvaged in a sophisticated operation involving a ‘grab dredger’ (James, 2017). Collectively, the wrecks were known as the Usukan wrecks, and prior to their salvage they teemed with colourful marine life and were encrusted with bright corals. Not surprisingly, the combination of WWII heritage and marine ecosystems were popular with divers, and thus, an economic asset to the local tourism industry (Daily Express, 2017). The alleged illegal salvage of these three Japanese wrecks is part of an ongoing investigation by the government of Malaysia’s Sabah state. Although the Marine Department of Sabah has confirmed that it had approved the salvage operation, the department lacked jurisdiction as the wrecks were located beyond Sabah’s territorial waters (Chan, 2017). Furthermore, the Sabah Museum is the other state authority involved in the administrative mix-up which led to the removal of the wrecks. The museum does not deny issuing an exploration permit but maintains that the permit did not allow for the removal of the wrecks. Apart from the administrative debacle resulting from inadequate consultation among state agencies, the case is of further interest as it involves marine pollution. In particular, it is alleged that the wrecks contained tonnes of ‘toxic materials’ (Geraldine, 2017).

**Why Steal WWII Vessels?**

Asian waters have played host to piracy and related maritime crime for years, particularly in places like the South China Sea area, where policing the vast ocean space is difficult (Rosenberg 2009: 43). However, today there is a new breed of pirates combing the waters off the coasts of Borneo, Indonesia, Malaysia, the Philippines and Singapore. These metal pirates ply the high seas in search of not only sunken treasure and ships
containing commercial cargoes, but also for the remnants of WWII wrecks. The value of sunken warships, such as *HMAS Perth* and the *USS Perch*, in comparison to merchant vessels, is their thick metal plating. The large financial gains to be made from scrap metal, in particular non-ferrous materials including copper, brass and bronze, encourages this illicit trade (Metcalf, 2016). Not surprisingly, as propellers are made of phosphorous bronze, they are highly prized by metal pirates due to their resale value (James, 2017). Moreover, the engine rooms of sunken vessels are full of brass and premium aluminum fittings. In other words, WWII wrecks are like a large underwater mine of precious metals awaiting discovery. Not surprisingly, we are now witnessing the emergence of a new type of maritime crime targeting the region’s WWII underwater cultural heritage (Sarawak Heritage Society, 2017; Watson and Quiano, 2016).

While transnational crime is by no means a new phenomenon, it has become increasingly diversified and organised (Henshaw, 2008: 112). Furthermore, as Percy points out, it is not uncommon for criminals to ‘divert their energies to new markets or areas’ (2016: 161). In addition, the role of organised crime, as opposed to opportunistic looters, is highlighted by the sophisticated equipment used in the recovery of scrap metal such as large barges, cranes and dredging equipment (Sarawak Heritage Society, 2017; Watson and Quiano, 2016). The threat posed by transnational crime relating to illicit shipbreaking activities underscores the importance the 2002 Declaration of the Conduct of Parties in the South China Sea signed by China and all ASEAN countries. Apart from agreeing to work together to protect the marine environment, State members consented to combat transnational crime, encompassing piracy and illicit trafficking offences (Keyuan, 2009: 85).
Conclusion

WWII shipwrecks are threatened by deterioration through corrosion, disturbance from trawlers, and looting by illegal treasure and relic hunters. Today, however, industrial salvagers are a heightened threat to our wartime heritage. As Innes McCartney, a nautical archaeologist points out, we are witnessing an increase in unofficial or illicit recovery of scrap metal from both WWI and WWII sunken warships (McCartney, 2017: 197).

The damage done by metal pirates, as discussed here, is unprecedented. Even in areas that are monitored by nations, such as major shipping lanes and sites located close to shore, metal pirates, often in conjunction with other criminal networks, have pillaged sunken vessels at an alarming rate. Without resolute efforts by States to promote public consciousness of the historic and emotive significance of WWII wrecks, the threat will likely not subside. Therefore, it is vital that States work closely with one another to consolidate collaboration and mutual assistance in the area of maritime cultural heritage. In addition, it is vital that States endorse WWII wrecks as ‘heritage’ assets so to give them the status beyond mere rusting hulls of ‘nuts and bolts’. Indeed, as His Honour Lord Phillips stated in the 2007 case of Government of the Islamic Republic of Iran v Barakat Galleries Ltd, ‘one of the most important national assets belonging to the people is their heritage’.

Furthermore, as was discussed, the illicit salvaging of WWII wrecks has the potential to release oil and toxic chemicals into the surrounding marine water resulting in the contamination of fishing grounds, so threatening the wider environmental security of the South China Sea region. Indeed, as the legacy of the Pacific conflict is represented by the number of warships that rest on the seafloor, there is the potential for serious environmental
harm to occur unless States cooperate with one another to prevent piracy and related maritime crime.

Finally, the strong public outcry over the looting of *HMAS Perth* and the international anger expressed in response to the more recent illicit activities of metal pirates, indicate that many communities around the globe do not condone the dismantling of WWII wrecks for scrap metal. Understandably, not all wartime remains can be protected. However, sunken warships should be treated with veneration, particularly as many still contain human remains.\(^9\) However, as *HMAS Perth* incident illustrates, the measures in place to protect military vessels from wanton looting are not perfect. One major problem relates to the fact that current protective measures hinge on the good will between the flag State and the coastal State. Undoubtedly, the problem with memorials to the dead located in foreign lands, including sunken WWII shipwrecks, is that they owe their existence to ‘the commitment of the host State’ (Bennett, 2012: 102). With these factors in mind though, one cannot lose sight of the cultural importance of shipwrecks as evoking a nation’s sense of the past, and more importantly, in respecting and honouring its war dead.

**Endnotes**


Cambodia ratified the 2001 CPUCH on the 24 November 2007.

In November 2013, China began a series of significant land reclamation projects in the Spratly Islands.


Association of Southeast Asian Nations (ASEAN). The association includes Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.


References


In 2017, Kim Browne completed her PhD in International Law with the University of Canberra, and is presently undertaking a book on her thesis study. The focus of her research spans international environmental law, ocean governance and underwater cultural heritage. As an academic, Kim’s accomplishments included establishing the inaugural Bachelor of Laws Degree at Charles Sturt University, Australia, with its unique focus on Indigenous culture and community law, and legal practice in rural and remote Australia. From 2007 to 2016, Kim lectured in Criminal Law and the Law of Evidence at Charles Sturt University. Between 2014 and 2016, she was the Course Director for the university’s Criminal Justice, Policing and Law programmes. Kim presently serves in the capacity of lawyer on Charles Sturt University’s Human Research Ethics Committee.
Abstract

MS Sophie Rickmers is a 134 meters long German ship which sunk at the beginning of World War II (WWII). Based on historical records, it can be known that Sophie’s crews sank her purposely to prevent a confiscation by the Dutch. This shipwreck site is located at 37-65 meters deep underwater Pria Laot Gulf, Weh Island, Aceh Province, which was one of well-known Dutch East Indies harbours in Indonesia. After 77 years, Sophie becomes a home for a very rich marine biota and coral reefs, and a prestigious WWII shipwreck diving spot in Western Indonesia which is popular among deep diving communities.

This paper will present a preliminary result of a marine archaeological survey carried out by the Research Institute for Coastal Resources and Vulnerability (RICRV) in March 2017. Five times of diving activities have been conducted to figure out and record the site recent condition. The research aim is to provide scientific data to support the latest ocean policy of the Indonesian Ministry of Marine Affairs and Fisheries (MMAF) regarding the development of an Integrated Center for Marine and Fisheries in the outer and small islands. Researching Sophie is also imperative due to some threats. In 2013-2014, local governments and commercial companies planned to salvage a significant amount of lead, the primary cargo of Sophie, and planned to build a giant oil bunker in the
These issues have raised local people as well as diving and history lover communities’ concerns. The petition to save Sophie has been signed by 15,043 people.

**Key words:** Sophie Rickmers, WWII Shipwreck, Underwater Archaeological Survey, Indonesian Ocean Policy, Weh Island

**Introduction**

Sabang City located in Weh Island, Nangroe Aceh Darussalam Province has been designated as one of 20 locations of an Integrated Marine and Fisheries Sentral Development in Small Islands and Border Regions according to the Decree of the Indonesian Minister of Marine Affairs and Fisheries (MMAF) No. 51 Year 2016. This coastal areas development policy considering principles of integration, efficiency, quality and high acceleration, is expected to encourage economic growth in small islands in Indonesian border areas based on marine commodities to reach an international markets. To support this national policy which also includes the initiation of maritime conservation area and marine tourism sector, research to identify potential marine and coastal resources on Weh Island needs to be done, including underwater cultural heritage (UCH) tourism. Due to this reason, Research Institute for Coastal Resources and Vulnerability (RICRV) carried out the study of marine archaeological resources, a Germany Motor Ship (MS) Sophie Rickmers (Fig. 1), in this region in 2017 to provide recent UCH data which has not been done by other institutions previously.
According to dive guides at Iboih Beach in Weh Island, the shipwreck of Sophie Rickmers is a favorite of many divers. Many of their guests claimed that this shipwreck site has made Weh Island one of the main diving destinations in Southeast Asia. They enjoys the challenge of seeing the underwater beauty of the site and witnessing the ecosystem richness surrounding the shipwreck area. Now, Sophie is the center of marine life in Pria Laot Gulf, Weh Island, Sophie becomes a a home to live and to find food for various marine biota, such as various types of coral reefs and beautiful colorful fish, both small and large fish. This biodiversity makes Sophie is alive for divers (National Geographic, 2014).

The issue of the threat to Sophie Rickmers shipwreck arose in 2013-2014. The Sabang City local government including the Concession Agency for Sabang Area declared the plan to construct a giant underwater oil bunker
in Pria Laot Gulf where *Sophie Rickmers* submerged. The purpose of this construction is to serve large ships in shipping industry of the international shipping line that cross through Sabang waters (Husein, 2014). The refueling service will attract many large ships to stop and dock in Weh Island. The local government was willing to revive Weh Island as a major port city and one of the main trade centers in Indonesia as it used to be in the past. In the Dutch colonial era, Sabang was a developed port due to its adequate natural condition including the depth of the sea water and the gulf condition which is protected from an extrem wave. Another issue was that the local company in Aceh Province, PT Samudera Ceudah Group, planned to salvage the cargo of *Sophie* (Mangalandum, 2014a). This company, supported by Sabang local government applied for a salvage permit to the Minister of MMAF, Mrs. Susi Pudjiastuti, on October 2014 (Husein, 2014).

These plans of the local government and company to salvage *Sophie*'s cargo and to build a giant oil bunker on the seabed adjacent to *Sophie*'s wreck were thought to endanger the shipwreck and all biodiversity around the site. The construction process using various heavy equipment and a number of ships to be deployed will be followed by a ban on diving in *Sophie Rickmers* site. Afterwards, when the bunker operates, there will be many boats passing by to refuel at the location (Pertiwi, 2013). With such conditions, it is certain that *Sophie*'s sustainability is highly threatened. In fact, Pria Laot Gulf is quite narrow, therefore it is impossible to build an oil bunker in the same area with underwater cultural heritage. It is unnecessary for Sabang to lose its identity as a diving paradise which benefits the fishermen and local communities only for the sake of sporadic development that is considered to damage the marine environment and also benefit only a handful of parties.
The concerns of the local people came up in the form of *Save Sophie Petition*. The petition has been signed by 15,043 people in Change. Org in 2014, and it was sent to the Minister of MMAF, Mrs. Susi Pudjiastuti, for her consideration. Eventually, the Minister, rejected the salvage application based on a Minister Regulation on a moratorium on survey and salvage license of sunken ship’s cargoes. The Sabang City Government, finally, cancelled the *Sophie* salvage plan and the building of a giant oil bunker in December 2014 (Mangalandum, 2014b).

**Research Objectives**

The main objectives of the research were to trace the WWII shipwreck in Weh Island and to figure out and record the current condition of *Sophie Rickmers* and its marine environment. Recording *Sophie*’s condition and identifying physical characteristics of this shipwreck site are necessary to provide a recommendation basis that should be highlighted for its long term protection and upcoming sustainable marine heritage tourism management. The research also aimed to support the Indonesian national policy regarding the development of Integrated Marine and Fisheries Center in Small Island and Border Areas to enhance the prosperity of local communities through the sustainable use of marine resources and marine tourism.

**Historical Background of MS Sophie Rickmers**

MS *Sophie Rickmers* was built in 1920 by Norddeutsche Werft Shipyard (Yard No. 171) in Geestemunde, which is part of Bremerhaven today, Germany for *Rickmers* Rhederei AG. She was launched in 16 June 1920 as *Sklave* and completed in 15 October 1920 which then named as *Sophie Rickmers*. The shipwreck found in Pria Laot Gulf was actually the
fourth Sophie Rickmers. Three other ships named Sophie Rickmers had been launched before the one sunk in Aceh (Stampehl in Mangalandum, 2014b). Sophie was a merchant vessel, and carried cargo for trading. However, what types of Sophie’s cargo could not be known since the Rickmers-Linie has lost the archives of Sophie during WWII (Mangalandum, 2014b).

Sophie started a voyage from Nordenham in 3 September 1939, passed by Antwerp, Hong Kong, and at last docked in Weh Island which was the territory of the Dutch at that time. At the time of war, German invasion to the Netherlands and other countries in Europe raised the resistance including a confiscation of German ships in many areas by the Dutch East Indies government. Therefore, in 1940, the Dutch tried to seize Sophie Rickmers. However, the crews preferred to sink Sophie on 11 May 1940 rather handed it in to the Dutch (National Geographic, 2014; Mangalandum, 2014b). During WWII, Sophie was one of five ships seized by the Dutch on May 10, 1940 in the waters around Weh Island.

Research Method
Underwater archaeological research in March 2017 was conducted in Pria Laot Gulf, Weh Island, Nanggro Aceh Darussalam Province. The survey site location can be seen in Fig. 2. To access Sophie Rickmers shipwreck site, the RICRV team needed a boat which was rent from the local dive centers in Iboih Beach tourism center. The location of the site could be reached in 30 minutes by boat from Iboih. The astronomical site position is Latitude: 5° 50.784' N and Longitude: 95° 17.869' E. The survey team included researchers, technicians, and administrative staff of RICRV; and also involved field assistants from local relevant agency (Sabang City Marine and Fisheries Agency), and local dive guides. In order to prepare
field activities, a coordination with relevant agencies located at Aceh Province and Sabang City has been done by telephone and email correspondences. Some technical meetings of the survey team have also been undertaken to plan the field survey activities.

The scope of work included collecting secondary data, meeting the local government and local dive guides, observing the site and surrounding area, secondary data collection. Literature data have been collected from local government technical reports, online reports and news on internet regarding Weh Island condition, Sophie Rickmers ship, marine tourism and tsunami disaster vulnerability in Weh Island and Aceh, and other issues regarding Sophie Rickmers salvage plan and its preservation. The first field survey included a number of activities such as interviewing local dive guides and diving activities. Interviewees were done to gather reliable information about the shipwreck site and the diving tourism industry in the area.
Diving activities conducted as many as five times which aimed to:

1. Locating the Shipwreck Position and Familiarization

   The first dive was conducted to find the position of the sinking ship in Pria Laot Gulf, and also as an initial observation to familiarize the site condition. Because the wreck is located in a fairly deep location of 37 - 65 meters, the dive team required a number of additional dive tanks carried by three dive guides. The use of rope for ascending and descending and dive computer were important. Safety diving principles such as bottom-time, diving time intervals, and safety stops were followed carefully by the diving team to avoid the risk of deep dive activities.

2. Visual Observations of Shipwreck Conditions and Underwater Documentation

   The next dives performed to make a careful visual re-examination of shipwreck, which aimed to identify the parts of the ship that are still recognizable. A thorough underwater video and photo documentation were done using two underwater cameras, Canon EOS 5D Mark III and G16, which were equipped by underwater flashlights. Figure 3 shows some underwater activities in Sophie site.
Findings

*Sophie Rickmers* was a cargo ship which had a dimension of 134.55 m × 17.55 m × 10.19 m, and its engine was one triple-expansion steam engine of 2900 ihp manufactured by Bremer Vulkan in Vegesack. Figure 4 shows the blue print of MS *Sophie Rickmers* which contained the general plan of this ship.
Fig. 4: The Blue Print of Sophie Rickmers General Plan. (Deutsches Schifffahrtsmuseum-digipeer)

Sophie is located on the flat sand seabed. The body ship condition was still intact about 70% in an upright position with the stern part at the base, and the steering room or wheelhouse at the most top. The wheelhouse began to appear at 37m deep. The deck is still visible now and can be found at a depth of 45 meters. The ladder and bow part of the ship are also still recognizable. The straight bow discovered on the bottom at a depth of 55 meters. Some parts of the ship such as stairs, steering room, engine room, a number of winch are also still can be clearly seen. Most of the ship's body lies between 55 - 65 meters deep. There was a crack in the middle of the body ship. Based on the information from local people and source on internet, it can be known that the cargo of Sophie Rickmers was salvaged in 1960s. The shipwreck site recent condition based on the team observation is showed in Figure 5 and Figure 6.
The visibility on site at the time of dive, vertically and horizontally, was clear, about 15-20m. It can reach up to 40 meters in maximum. A bottom dive time was 20 minutes, and a decompression time up to 90 minutes. The average sea current speed in the area was about 1-2 knots. Sophie’s sturdy body frame with its rooms becomes a home for coral reefs and
other marine biota. A healthy coral have covered the body ship. Various marine life occupy this wreck site include giant trevallies, a school of unicorn file fish, giant moorays eels, bat fish schooling, large scorpion fish, lion fish, jellyfish, pompano, sea anemone, colourful algae, and some other reef fish. Black-spot angelfish (*Genicanthus* melanospilos) which is fairly difficult to find because its habitat is in deeper waters (Pulau Weh Resort, 2013), is abundant on *Sophie* site. Divers can also spot marble rays and giant groupers.

**Sophie Rickmers Preservation Awareness**

The most significant aspect that can be appreciated in heritage preservation in Weh Island is the awareness of the local communities and young generation. From the petition signed to save *Sophie Rickmers* in 2014 from salvage and underwater oil bunker construction, it is clear that their heritage awareness was high and invaluable which help *Sophie* in avoiding her destruction. The public were aware that if *Sophie* destroyed, they will lose a historical proof, and divers will lose a unique site. The initiator of *SaveSophie Petition*, Husein (2014), mentioned that:

“If *Sophie* were dismantled, then the bad consequences will affect all sectors that Sabang were proud of it: tourism, diving industry, marine biodiversity, fresh seafood, subsistence fishermen, and knowledge of history. Giant oil bunker will make a huge amount of money. But, should be exchanged with the loss of crystal clear sea? white soft sand beach? the marine biodiversity? marine richness and fish spawning area? sea history? and the source of life of the fishermen? Should Sabang lose its identity as one of Indonesia diving paradise? Then, when all was lost along with *Sophie*, what will be our heritage for our children and Sabang next generations?”
Many young generations signed this petition because they did not want the sustainability of marine environment and heritage preservation will be disrupted by the salvage plan of *Sophie Rickmers* and the construction of oil bunker. They hoped all people and their government can safeguard *Sophie* so that it can bring in more tourists to Weh Island. They pointed out that marine life and historic evidence are more valuable and priceless than oil and gas exploration which will not benefit local communities. They considered sustainable tourism more useful for the welfare of Weh communities. Therefore, they firmly rejected the plans of Sabang local government and preferred *Sophie* to be protected and introduced to the world so that neighboring countries are better acquainted with Indonesia.

Wildanto Nusantara, one of people who signed the petition mentioned "While we preserve our heritage, we can also maintain our underwater ecosystems. I am a diver, although it is too deep to dive with standard compressed air diving, but she is a treasure to safeguard, and of course it has a historical legacy" (Husein, 2014). Other supporter said: "Government policy must be environmentally friendly and benefit the community. The salvage of this ship will harm both of these" (Nur Aeni Amaliah in Husein, 2014). "A historical site that at the same time is a source of marine life and fisher, should be preserved and managed as a source of knowledge, tourism assets, and heritage. *Sophie* is too good to be lifted. Money can be sought, but History cannot" (Ali Aqsa in Husein 2014).

**Discussion**

Until today, international tourists from many countries perceive Weh Island as a holiday destination which offer a thorough tourism package such as diving, snorkeling, and other marine tourism attraction (Chan,
Some of the potentials and opportunities that will be the basis for developing marine tourism at Weh Island are the presence of very potential *Sophie Rickmers* WWII shipwreck for special interest tourism including wreck diving, deep diving, underwater photograpgy and marine biodiversity research; the condition of an archipelago consisting of small island clusters with safe and protected water conditions and rich in nutrients causing the richness of marine biodiversity; unique oceanographic conditions such as the presence of large waves in some areas which is potential for surfing; as well as exotic environment panoramas on small islands around this area are a strong attraction for tourists.

The authorities of Aceh Province has made many efforts to promote Weh Island as tourism destination after tsunami disaster in 2004 and post-Aceh conflict. Along with Japanese Fortress remains, the historic Rubiah Island, Zero Kilometer Point of Indonesian Archipelago, and the unrivaled marine environment of Weh island, the presence of *Sophie Rickmers* shipwreck site would surely attract tourists and enhance the communities prosperity.

**Conclusion**

The shipwrecks at the bottom of sea waters are a source of maritime history studies of the region and could reveal the significance of the area in the past. While from the ecological side, shipwrecks become the habitat of many species of fish, invertebrates, algae, and corals. Thus, *Sophie Rickmers* in Aceh Province is undoubtedly contained a wealth of invaluable knowledge for present and future generations. Based on the initial survey conducted by RICRV, *Sophie's* condition is still good and intact. However, since the location of the wreck is deep, diving *Sophie* is high risk due to a decompression sickness such as Nitrogen Narcosis. Therefore, this site is recommended for experienced divers having high
Tourist diving Sophie must aware with some dangers such as the depth, stonefish, stingrays, fishing nets, sharp and rusted iron part of body ship which may fall apart if divers penetrating the shipwreck. Due to those conditions, it is highly recommended that diving operators in Weh Island must ensure their guests have sufficient skills and awareness to dive at this point. Checking tourist's dive certificates and their experience is necessary.

On the other hand, the deep location of Sophie, the richness of marine life, and the challenge to perform deep dive, make Sophie an exclusive diving spot in Indonesia. Sophie's existence is one proof that the city of Sabang in Weh Island has been a major port and battle area in the WWII era. Today, as one of the favorite diving destinations in the waters of Prialaot Gulf, and as one of the remains of World War II history, Sophie is still waiting for conservation efforts from heritage agencies in Indonesia such as the Ministry of Marine Affairs and Fishereies and the Ministry of Education and Culture.

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Biographies

Nia Naelul Hasanah Ridwan is Maritime Archaeology Researcher working in Ministry of Marine Affairs since 2005. She hold a Master of Social Science in Environment and Heritage from James Cook University. Until present, she has led some research projects on underwater cultural heritage (UCH) sites throughout Indonesian Water. For her dedication, The President of Indonesia awarded Satya Lancana Wira Karya Award in 2015. Nia's interests include the relationship between UCH and its environment; threats to UCH; UCH long term protection; maritime museum affairs, community engagement; marine-heritage tourism; and illicit trafficking of underwater remains. Nia had attended some trainings held by UNESCO, ICCROM-SEAMEO SPAFA-The Getty Foundation, and The Netherlands Cultural Heritage Agency. She has published her research results in some conferences and other publications.

Gunardi Kusumah has been working in the Ministry of Marine Affairs and Fisheries. In 2010, he was assigned as a Head of Research Institute for Coastal Resources and Vulnerability (RICRV) until present. His research interest is an Environmental Geology area. In recent years, he has focused his research on hydrogeology and groundwater resources, especially their characteristics and potency, as well as the interaction with coastal environment. He was also involved in all maritime archaeological researches conducted by RICRV from 2012-2017, and dedicates his expertise on sedimentation process and marine geological aspects to examine the vulnerability of shipwreck sites.
Japanese Shipwrecks and Human Remains from WWII

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Abstract

During WWII, over 7,000 Japanese vessels sank; the rough allocations of warships, freighters, and small vessels less than 100 tons are 500, 2,500, and 4,000, respectively. Since 1945, Japan has not passed any domestic laws concerning those shipwrecks, and many problems related to the absolute sovereign immunity of warships or shipwrecks within the territorial waters of newly independent countries have not been resolved. In addition, there are still 300,000 submerged human remains of Japanese soldiers and sailors under the sea. According to Japanese philosophy, all human remains in the overseas services must be brought back to their homeland for burial. Nevertheless, the Japanese government, which recognizes shipwrecks with human remains as war graves, has been inactive in recovering submerged remains or repatriating them, also partly due to technical and economic reasons. Since the end of the last century, however, salvage or scuba diving technology has rapidly improved; not only have many Japanese shipwrecks been commercially salvaged for iron scraps with remains being abandoned on sites, but also some foreign scuba divers have recovered Japanese human remains as souvenirs. It is high time Japan recovered and repatriated all of its submerged human remains while the Allied Powers, Japan, and Southeast Asian and Pacific nations should work together for protecting shipwreck cultural heritage.

Key words: Imperial Japanese Navy, Freighters, Submerged Human Remains, Repatriation, UNESCO 2001 Convention

Introduction

During WWII, over 7,000 Japanese vessels sank. Since 1945, Japan has not passed any domestic laws concerning those shipwrecks, and many
problems related to the absolute sovereign immunity of warships or shipwrecks in foreign waters have not been resolved; the Japanese government has done to avoid active involvement with them. In addition, there are still 300,000 submerged human remains of Japanese soldiers and sailors under the sea, which Japan regards as being sacred and inviolable. The UNESCO 2001 Convention stipulates that submerged human remains could be underwater ‘cultural heritage’, which should be preserved *in situ* (Iwabuchi, 2012). According to Japanese custom and governmental policy, however, they will have to be recovered and repatriated against the convention.

**Japanese Vessels Sunk during WWII**

As soon as the Imperial Japanese Navy attacked on Pearl Harbor in the early hours of 7th December 1941, the Pacific Theatres of WWII started. For the purpose of sinking U. S. warships there, the Imperial Japanese Navy did not use its battleships, but use its airplanes taken off from 6 aircraft carriers, viz. IJN Akagi, IJN Kaga, IJN Soryu, IJN Hiryu, IJN Zuikaku, and IJN Shokaku, and 5 midget submarines. Of those submarines 4 were sunk by the U. S. Navy and one grounded on Oahu island; these were the first Japanese shipwrecks from WWII. The midget submarines launched from on the decks of bigger mother submarines just outside of Pearl Harbor. Although the mission seems to have been ‘difficult-to-return’, the midget submarines themselves were not built as kamikaze or suicide attack weapons.

In a vindictive mood the U. S. Navy sank the Japanese aircraft carriers of IJN Akagi, IJN Kaga, IJN Soryu, and IJN Hiryu during the battle of Midway.
In June 1942, IJN Shokaku during the Battle of the Philippine Sea in June 1944, and IJN Zuikaku during the Battle of Leyte Gulf in October 1944. At the last sea-fight, the U. S. battleships of USS Maryland, USS West Virginia, USS California, USS Tennessee, and USS Pennsylvania, all of which were damaged by the Pearl Harbor attack and underwent repairs into modern battleships, succeeded in sinking 2 Japanese battleships, viz. IJN Yamashiro and IJN Fuso, and 3 destroyers during the head-on Battle of Surigao Strait. Including those losses, eventually, the Imperial Japanese Navy lost approximately 500 warships such as battleships including the heaviest ones of IJN Yamato and IJN Musashi, aircraft carriers, cruisers, and submarines from 1941 to 1945. If the number of losses of suicide motorboats (Fig. 1) or human torpedoes (Fig. 2), which the Imperial Japanese Navy recognized not as vessels but as weapons, is added to them, the total figure could be more than 3,000.

Fig. 1: Suicide Motorboat (Replica).
During WWII, however, Japan lost more mercantile vessels than warships. After the Pearl Harbor attack, Japan quickly occupied the whole area of Southeast Asia and most parts of the western Pacific. Thousands of Japanese freighters were conscripted from private liners for seaborne transportation between Japan and occupied territories. At first the Japanese government regarded sailors as civilians since the government and private shipping companies exchanged consignment contracts, but then after 1943 all sailors became civilian war workers. Finally, approximately 2,500 Japanese freighters sank, and 60,000 sailors were killed from 1941 to 1945. As human damage, that of seamen is more serious than that of army or navy soldiers; the wear-out rate of army soldiers was 20% and that of navy ones was 16%, while that of sailors was 43%.

The remarkable loss of Japanese freighters started at the Battle of Guadalcanal in Melanesia. Out of 11 Japanese freighters which
transported army soldiers, weapons, ammunitions, or other supplies to Guadalcanal Island in November 1942, for instance, 6 were bombed and sunk, 1 was escaped, and the remaining half-damaged 4 did run aground on Guadalcanal Island during the Third and Fourth Battles of Savo Island. At the Operation Hailstone in February 1944, 33 Japanese freighters were bombed and sunk in the Truk anchorage of the Imperial Japanese Navy. The Japanese freighters were extremely vulnerable against air raids or submarine attacks, mainly because the Imperial Japanese Navy had no plan for escorting freighters by convoy system in the early days of the war. Its utmost duty was believed to combat against enemies’ naval fleets, not to guard mercantile vessels.

In January 1945, the last Japanese convoy of freighters was totally wiped out. It consisted of 1 light cruiser, 5 escort ships, and 10 freighters including 5 tankers which carried mainly natural resources from occupied Southeast Asia such as oil, crude rubber, bauxite, or tin. On 12th January 1945, U. S. airplanes from the aircraft carries of USS Enterprise and USS Independence attacked its convoy violently off French Indochina. In the end, 1 light cruiser, 2 escort ships, and all of the 10 freighters were bombèd and sunk. As its convoy was destroyed near the seashore, fortunately, the number of deceased sailors was relatively low and those submerged wrecks still exist off Vietnam (NHK, 1995). After this massive loss, the Imperial Japanese Navy abandoned the short-lived convoy system, and adopted the guerrilla transportation system consisting of only a few freighters. Under these guerrilla actions, 20 Japanese freighters sank out of 45 ones from January 1945 to March 1945 though.

At the end of WWII, the Japanese government strengthened the conscription even of small vessels less than 100 tons such as wooden
fishing boats or sailing ships in order to make up, in particular, for domestic freighters or patrol vessels. As for the domestic transport, Japan always depends upon shipments rather than railway networks. For example, rice which is the staple food for Japanese has usually been transported from northern Japan to Tokyo or to Osaka by ship since the Edo period. The U. S. Navy, therefore, started to physically target those tiny vessels at the last stage of the war. At least 4,000 or at most 4,500 such vessels were sunk. Finally, Japan suffered serious shortages of food and supplies due to air raids, submarine attacks, and naval gunfires by the U. S. Navy.

**Japanese Shipwrecks after WWII**

Japan surrendered to the Allied Powers on 2nd September 1945. On 24th September 1945, Japan and the Supreme Commander for the Allied Powers signed a memorandum titled ‘The Matter upon Materials, Supplies, and Equipment Which Have Received or Will Receive from the Japanese Troop’, which proclaimed that ownership of all arms and other military properties of the Imperial Japanese Navy and Army was to be transferred to the Allied Powers, without exchanging any complete lists of military properties in the chaotic times just after the war, and this memorandum was ratified by the Treaty of San Francisco or the Peace Treaty with Japan in 1951. However, the military materials, supplies, and equipment, which could not be used for actual battles any more, were to be returned to the Japanese government.

Many sunken vessels, which were not suitable for military use, were returned to the Ministry of Finance, Japan, not to the Ministry of Navy, Japan, by the Allied Powers, because both the Ministries of Army and Navy, Japan, were abolished in November 1945. After this returning,
many wrecks in Japanese ports or near its coastal lines were salvaged to be sold their scrap metal. On the other hand, some vessels were not returned to the Japanese government as the Allied Powers thought they were still usable for military purposes. Without any complete lists of sunken vessels at the beginning, some transactions concerning Japanese sunken vessels, which are in particular within the territorial waters of newly independent nations, have remained unsolved.

According to the customary law of the sea, the sovereign immunity of warships has never been ceased even within foreign territorial waters. In order to define its position clearly, the President of the U. S. Bill Clinton gave the following statement on U. S. policy to protect sunken state craft on 19th January 2001:

“The U. S. will use its authority to protect and preserve sunken state craft of the U. S. and other nations, whether located in the waters of the U. S., a foreign nation, or in international waters (U. S. Government Publishing Office, 2001).”

Since 1945, however, Japan has not passed any domestic laws or cabinet orders concerning Japanese shipwrecks from WWII.

The Japanese government has not been so interested in its shipwrecks or, in other words, done to avoid active involvement with them, for a few reasons. First of all, nobody knows where the responsibility of shipwrecks lies inside its bureaucratic system after 1945. The Ministry of Navy does not exist, and, in addition, the Ministry of Defense, Japan, as a rule, has not taken over any duties of the Ministries of Army and Navy before 1945. Therefore, the Ministry of Finance, Japan, received the returned sunken
vessels from the Allied Powers, officially by way of the Ministry of Domestic Affairs, Japan. The Ministries of Army and Navy handed over their repatriation duties of human remains of those killed during WWII to the Ministry of Health, Labour and Welfare. The Agency for Cultural Affairs has no authority outside the Japanese territorial waters. Since 1945, secondly, both the government and post-war Japanese generally have been seized a keen desire to forget WWII as soon as possible. There has also been a tacit understanding that its national budget should not be used for war shipwrecks. Because the public strongly support this kind of feeling and course, the government has basically pretended not to see Japanese shipwrecks from WWII.

Since the end of the last century, salvage or scuba diving technology has rapidly improved; many Japanese shipwrecks from WWII in the Asia-Pacific region have been commercially salvaged for iron scraps. In 2014, the Japanese cruisers of IJN Haguro and IJN Kuma and the armed freighter of the Chosa-maru were salvaged illegally for iron scraps off Penang, Malaysia, with Japanese human remains being abandoned on sites. In Japan, however, this incident was not bought up by mass media a lot and the public opinion was not heated, either. In 2017, some archaeologists at the Malaysian University of Sabah and a ‘legal’ salvage company salvaged and destroyed 3 Japanese freighters, viz. the Nichiwamaru, the Higane-maru, and the Kokusei-maru, which were hit by torpedoes from the submarine of USS Hammerhead and sank in September 1944 at the Usukan Bay off northern Borneo.
From 1977 to 1980, not for scrap metal but for alleged treasure, the Chinese government salvaged the Awa-maru, a hospital ship under the protection of the Red Cross, which was sunk by torpedo attacks from the submarine of USS Queenfish in 1945 off the Fujian Province. China did not manage to find any precious cargos, but succeeded in recovering many human remains and their belongings, which were later sent on to the Japanese government. In 1942, the Dutch hospital ship of the Op Ten Noort was requisitioned by the Imperial Japanese Navy off Java. Just after WWII, it was forced to be sunk deliberately by the Imperial Japanese Navy off the Wakasa Bay in Japan. Legally under Japanese civil laws, some salvage companies have tried to recover treasures which are said to have been loaded on it. However, it has been unsuccessful.

Recently in some areas of the Asia-Pacific region shipwrecks themselves have been becoming dangerous time bombs; their oil or chemical containers and unexploded bombs are deteriorating over time to cause some damages to the ocean environment. In the Truk Lagoon, the Japanese shipwrecks are leaking oil or aviation fuel, which has already washed up on seashores and polluted mangrove forest. Indeed, the cleaning processes are under way, but they seem not to catch up. The Palau government has designated them as historic sites in order to protect them (Ishimura, 2017), but fun divers continuously steal some relics or human remains from them.

**Submerged Human Remains**

There are still 300,000 submerged human remains of Japanese soldiers and sailors under the sea. According to Japanese philosophy, all human remains in the overseas services had to be brought back to their
homeland for burial. Especially in the history of the Imperial Japanese Army, this custom was fully implemented. Before overseas developments of troops, the Japanese government pledged to all soldiers that it would repatriate their human remains at all costs. On the other hand, for instance, the British Commonwealth had a different policy; it advocated to trench the fallen soldiers at war cemeteries in its colonies or in foreign countries so that war widows might easily remarry. In Japan, a Confucian principle is ubiquitous, saying that ‘royal subjects never serve two kings and chaste wives never marry two husbands’. It is believed that Japanese war widows ought not to remarry and must tend their dead husbands’ domestic graves for ever.

Although the Imperial Japanese Navy usually followed this basic philosophy, it frequently consigned the dead soldiers’ bodies to the watery grave (Harada, 2003), which was and is the common practice among the Royal or the U. S. Navies. In addition, shipwrecks which deeply sank into water with human remains were not taken the trouble to be salvaged at considerable expenses. In response to these mores, the Japanese Prime Minister Yasuhiro Nakasone, who used to be a naval officer, made the following reply on 13th February 1987 in the House of Councillors:

“Based upon thinking that the sea itself is a kind of resting place for the war dead, the Japanese government makes it a rule not to recover submerged human remains from shipwrecks and then not to repatriate them. However, if human remains are too public and their sanctity and inviolability are especially infringed and only if it is technically possible, the government could do it exceptionally (House of Councillors, 1987).”

Until Today, therefore, the Japanese government has been inactive in recovering submerged human remains or repatriating them. With low-costed underwater technology has rapidly improved and scuba diving has
become so popular, however, it has been by far easier to gain access to submerged human remains and some foreign scuba divers have recovered Japanese skeletons as souvenirs, for instance, in the Truk Lagoon. Japanese keep no human remains or bones at hand as souvenirs or even as sacred relics; most Japanese are frightened and disturbed at seeing saints’ bones exposed to public view in some European churches. Japan recognizes human remains as being sacred and inviolable, not because they are full of purity, but because they are full of impurity (Iwabuchi, 2014). Because of this folk belief, even more than purified objects, the impurified ones of human remains have to be kept away, to be buried in proper places, and to be worshipped properly (Douglas, 1966).

In the 1950’s, the Japanese government adopted an exceptional policy toward soldiers’ remains or ‘only token disinterment’, succumbing to the Allied Powers. As numberless soldiers’ remains scattered over the Asia-Pacific region, bringing only a part of human remains back to Japan was made better. Since the end of the 1960’s, however, the governmental policy has been changed again; the Ministry of Health, Labour and Welfare, Japan, has kept recovering and repatriating all Japanese human remains with an enormous national budget (Hamai, 2014). In 2016, for example, collecting Japanese human remains on land was done in Iwo Jima, the Solomon Islands, and the Palau Islands. All human remains were brought back to homeland. In the near future, hopefully, a governmental repatriation programme of Japanese submerged human remains will be started in the Asia-Pacific region.

After repatriating human remains, DNA testing on them is sometimes performed in order to be identified bereaved families or relatives. When the Japanese government succeeds in finding them, the remains are to
be handed over to them; they hold funerals, and then they consign the remains to the graves. When neither family nor relative are found, contrariwise, the remains are placed in the Chidorigafuchi National Cemetery, which is located near the outer moat of the Imperial Palace in Tokyo (Fig. 3). However, this cemetery is not a kind of tomb of the unknown warrior to which all Japanese pay homage, because it keeps only unidentified human remains of soldiers, civilian war workers, and civilians who died in foreign countries during WWII. It is completely different from, for instance, the Arlington National Cemetery in the U. S.

Fig. 3: Chidorigafuchi National Cemetery.

In Japan, the tomb of the unknown warrior is the Yasukuni Shrine or the War Shrine (Fig. 4). It was founded by the Japanese Emperor in 1869 and still commemorates those who died in military service of Japan, including all soldiers, almost all civilian war workers, and some special civilians. Although the Yasukuni Shrine is the ‘tomb’ of the unknown warrior, it does not have any human remains at all inside its holy precincts.
The shrine keeps only the book of souls, i.e. list of names of the deceased. After the souls on the book are reflected by the mirror as the object worship believed to contain the spirits of deities and are enshrined together in the Yasukuni Shrine, they become divine spirits or holy spirits of war dead which are sorts of national guardian angels. All naval dead soldiers and almost all dead civilian naval workers are listed on the book of souls at the Yasukuni Shrine, but some workers and many sailors are not. In 1971, therefore, the War Memorial for Dead Sailors to commemorate all seamen who died during WWII was built in Yokosuka City at the mouth of the Tokyo Bay.

Fig. 4: Yasukuni Shrine.

**Conclusion**

As long as no one could approach to submerged human remains inside Japanese shipwrecks, they could remain to be untouched there inside the underwater graves of shipwrecks. As soon as any divers or underwater vehicles succeed in coming close to them to be able to observe them,
however, they will have to be recovered and repatriated. Japanese fear not only that the sanctity and inviolability of human remains will be infringed, but also that the impurity of human remains might be transferred to those divers or vehicle operators. Nevertheless, the UNESCO 2001 Convention provides that human remains are a part of underwater cultural heritage. Its annex provides that ‘activities directed at underwater cultural heritage shall avoid the unnecessary disturbance of human remains or venerated sites’, but the UNESCO rather recommends the preservation\textit{ in situ} of underwater cultural heritage including human remains.

Japanese shipwrecks from WWII should be protected as underwater cultural heritage. Perhaps, it is high time the Allied Powers, Japan, and Southeast Asian and Pacific nations should work together for preserving shipwreck cultural heritage in the Asia-Pacific region. It might be unavoidable that there will be a movement to reutilize Japanese shipwrecks as underwater museums, diving spots, or even tourist attractions later. If some Japanese human remains are still there, however, all Japanese think that the top priority task would be recovering and repatriating them at any cost. Indeed, the recovery of those remains would contravene the UNESCO 2001 Convention (Pererz-Alvaro, 2014), but many Japanese families are still looking forward to seeing that their grandfathers’, fathers’, or uncles’ bones come back to their hometowns. In Japan, the Pacific theatres of WWII have not finished yet in terms of its shipwrecks and human remains.

\textbf{References}


Biography

Akifumi Iwabuchi is Professor of Maritime Anthropology and Nautical Archaeology at Tokyo University of Marine Science and Technology, a member institution of the UNESCO Underwater Archaeology Unitwin Network. He is the ICOMOS-ICUCH National Representative for Japan, being also Directors of the Japan Society for Nautical Research, of the Asian Research Institute of Underwater Archaeology, and of the Forum on the Oceanic State of Japan. He received his PhD from the University of Oxford in 1990. His publications include *The People of the Alas Valley* (Clarendon Press, 1994) and *Cultural Heritage under the Sea: An Introduction to Underwater Archaeology* (Kagaku-Dojin, 2012).
War in the Pacific: Difficult Heritage

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Abstract

War in the Pacific: Difficult Heritage, a National Endowment for the Humanities-funded project of East Carolina University in partnership with the Northern Marianas Humanities Council and the Saipan Historic Preservation Office, engages veterans of contemporary wars, surviving civilian participants of WWII, and families of military service personnel in considering how difficult heritage can be seen as universal to humanity and how it can be used to examine the veteran’s experience and even heal and renew. The starting point for this consideration is to focus on the historical and contemporary warrior/veteran’s experience as it relates to our collective human experience of war and how we might come to understand and interpret the heritage created through conflicts as shared, collective heritage.

This process is accomplished through the development of a program that train local Saipanese community members with experience and interest in humanities, history and veteran affairs to be discussion leaders who will conduct humanities discussion groups with local, primarily Chamorro and Carolinian, veterans. The wars chosen are the Spanish-Chamorro Wars of the 17th century and the WWII Battle of Saipan as bookends to the history of resistance and aggressions in the islands. Together these wars were chosen because they represent the complexities of all of the participants of war, combatant and non-combatant, in a colonial and post-
colonial context. Through the exploration of terrestrial and underwater cultural heritage, film, history, memoirs, children’s historical fiction, poetry, painting and graphic novels, a focus on multi-vocality will be critical to understanding the meanings of war from different perspectives.

Key words: Pacific, World War II, Saipan, veterans, Spanish-Chamorro War

Introduction

Our heritage is our past. It is the tangible reminder of who we are, where we came from, and can even give us clues to where we are going. Heritage is essential to our collective past and can help us to look beyond our distinctive differences to see common ideas and mutual goals that all of humanity shares. As such, heritage can provide a foundation for understanding human kind. Some have argued, heritage, even the difficult heritage that relates to past conflicts, has the abilities to heal or renew in post-conflict or post-colonial contexts.

War in the Pacific: Difficult Heritage, a National Endowment for the Humanities grant-funded project of East Carolina University (ECU) in partnership with the Northern Marianas Humanities Council (NMHC) and the Saipan Historic Preservation Office (HPO), engages veterans of contemporary wars, surviving civilian participants of WWII, and families of military service personnel in considering how difficult heritage (which relates to past conflicts) can be seen as universal to humanity and how it can be used to examine the veteran’s experience and even heal and renew. The starting point for this consideration is to focus on the historical and contemporary warrior/veteran’s experience as it relates to our mutual human experience of war and how we might come to understand and interpret the heritage created through conflicts as a shared, collective heritage.
The program focuses on a less-represented and supported veteran community, Indigenous Pacific islanders. According to the US Census there are 27,469 Native Hawaiian and Pacific Islander military veterans living in the US with 685 in Saipan, Commonwealth of the Northern Mariana Islands (CNMI). This program trains local Saipan community members with experience in humanities, history, and veteran affairs as discussion leaders who conduct humanities discussion groups with local, primarily Indigenous Chamorro and Carolinian, Saipan veterans. As such, the program supports NEH’s *Standing Together* initiative for “helping Americans to understand the experiences of service members and in assisting veterans as they return to civilian life” by assisting to re- and integrate Pacific Islander veterans into a sociocultural position of authority on the history of war in their islands.

**Background**

The Mariana Islands, a Micronesian island chain in the western Pacific, and its Indigenous peoples have been the subject and location of numerous episodes of colonial aggressions and resistance from the Spanish in the 17th century, to the Germans in the 19th century, to Japan and the United States of America (US) in the 19th and 20th century. Invasions, battles, and colonial aggressions have been waged with and on top of the first Indigenous peoples, the Chamorro, and the Carolinians who immigrated to the Marianas from southern islands. As such, the land and seascape represent in both tangible and intangible ways the cultural heritage of those conflicts, the oldest of which are the Spanish-Chamorro Wars and the most recent and prominent is the WWII Battle of Saipan. Today, Indigenous island residents navigate daily through their island reminded by the battles and wars that have both defined and challenged who they are and where they are going. But what do they think of this
conflict heritage? How do they relate to it and their ancestors who were involved? Is it their history or some colonial aggressors’ history?

War in the Pacific engages local veterans, surviving civilian participants of WWII, and families of military service personnel in exploring, understanding, and personalizing their experiences with the island’s cultural heritage of war through textual and film humanities sources, and the heritage itself. Through the exploration of these humanities sources, it is hoped that veterans gain a meaningful and relevant understanding of war as a shared human experience, and come to see the associated cultural heritage of war on their island as shared cultural heritage. It is hoped that these personalized interactions with both the physical, tangible remains of heritage sites and humanities texts and film provide a new or renewed sense of cultural value for both the veterans’ experiences and the local conflict heritage.

Wars
The discussion sessions focus on two wars: the Spanish-Chamorro Wars of the 17th century and the WWII Battle of Saipan as bookends to the history of resistance and aggressions in the islands. The Spanish colonization of the Marianas in the late 17th century represents the “discovery” of the islands and the “fatal impact” of Europe on a Pacific island culture. It began with cultural suppression, a depopulation and consolidation of island peoples, and religious fanaticism and conversion through missionization. These events that spanned over a century, although tragically catastrophic for the Chamorro, were met with resistance and agency in what has become known as the Spanish-Chamorro Wars. This war is little understood historically and archaeologically and in some ways is overlooked because its related heritage is ephemeral and the history has been written primarily from the Spanish perspective. However, it is beneficial for exploring and
understanding how Indigenous peoples and warriors both resisted colonial powers and acted as their own agents negotiating allegiances for their benefit. Additionally, it provides an opportunity to examine how war can be complex and have multiple viewpoints through exploring the relationship between Spanish state and church and their often conflicting agendas. It also serves to explore themes around modern resistance to colonialism and military build-up, which is an intense current affairs topic since the US and Asian nations are presently using Pacific islands for staging military activities.

The WWII Battle of Saipan was an intense aerial, amphibious and terrestrial battle fought during June/July of 1944. It involved the warring Japanese and US forces, as well as Chamorro, Carolinian, and Japanese civilians and conscripted Korean soldiers. The battle left almost 3,000 US soldiers, about 30,000 Japanese soldiers, and over 900 Indigenous civilians dead, with approximately 1,000 Japanese civilians committing suicide in the final days of the battle. The US capture of the Marianas was a decisive turning point in the war as it put US bombing campaigns within reach of Japanese homeland, eventually leading to the atomic bombs that ended the war. The use of the WWII Battle of Saipan is valuable to participants for exploring civilians’ experiences during war. It is also useful for identifying what struggles and opportunities the post-war period (1945-1978) brought to the island that reach past today into the future of their children and grandchildren, who continue to serve in the military but now fight for the US. It also affords an opportunity to contemplate the most obvious and tangible conflict heritage that covers the island through an existing WWII Maritime Heritage Trail and the most personalized Indigenous heritage of WWII – the caves civilian families used for protection during the invasion. As a more recent war of living memory, it
provides a stronger connection to the past and also the present for veterans who have served in contemporary wars.

Together these wars were chosen because they represent the complexities of all of the participants of war, combatant and non-combatant, in a colonial and post-colonial context and what that might mean to the community of Saipan. As Sharon Macdonald shared in her book *Difficult Heritage Negotiating the Nazi Past in Nuremberg and Beyond* (2015), the difficulty in discussing these conflicts lies in how their heritage can be used to expose a damaging and painful aspect of history without demonizing the perpetrator and the perpetrated or creating an identity of perpetration and an identity of victimhood. It is hoped that through the careful and mediated exploration of humanities sources the discussion of these wars can avoid these trappings and have a positive healing and renewal effect for veterans and the wider community.

**Themes**

The discussion program incorporates a range of rich humanities sources including archaeology, film, history, memoirs, children’s historical fiction, poetry, painting, and graphic novels. A focus on multi-vocality can be critical to understanding the meanings of war from different perspectives and, as such, the sources were chosen explicitly to be illustrative of many voices. *War in the Pacific: Difficult Heritage* focuses squarely on “heritage of war” through five intersecting themes chosen for their association with Saipan’s colonial history, its difficult heritage, and the veteran’s experience. These themes include: Veteran and Indigenous identity; The enemy; The civilian; Memorialization; and Conflict heritage.

**Veteran/warrior and Indigenous identity**

This theme seeks to explore the unique intersections of being an Indigenous Pacific Islander and a warrior/veteran. Indigenous peoples have served in the US armed forces in every major conflict since the
Revolutionary War and during WWII hundreds of Native Americans served pivotal roles as Code Talkers in their native language. Sitting Bull said, “The warrior, for us, is one who sacrifices himself for the good of others. His task is to take care of the elderly, the defenseless, those who cannot provide for themselves, and above all, the children - the future of humanity.” This discussion focuses on defining who that warrior/veteran is through the history of the Marianas. Participants read portions of *Tiempon I Manmofo’na: Ancient Chamorro Culture and History of the Northern Mariana Islands*, which tells the story of the arrival of the first peoples through the archaeological record. Chapters such as “Weapons and Warfare” are particularly poignant in understanding ancient war and conflict. *I Manmañaina-ta*, a Chamorro authored and illustrated graphic novel of sorts, tells the story of several prominent warriors who fought in the Spanish-Chamorro wars. Through a graphic history, discussion participants can come to understand the characteristics of these warriors and the role they played in the resistance movements of the Spanish colonial period. Heritage site visits to the largest Spanish-Chamorro War battle site and cemetery on Saipan help participants to experience and visualize firsthand the tangible location of an important battle and personalize their understanding of a poorly understood conflict.

**The enemy**

This discussion session theme focuses on the complex and diverse relationship between the soldier and their enemies. The session explores how the enemy is classified in one’s mind as “the Other,” the alien, and how that allows for combat between two sides to exist. This is particularly important when it comes to understanding how race was used in creating the Japanese enemy during WWII and how “alien” the Spanish might have seemed for 17th century Chamorro. Participants read Hurao’s speech from the late 17th century. Hurao was a celebrated Chamorro chief who inspired
an army of 2,000 to fight the Spanish. Today his speeches are often quoted as examples of resistance and calls for action against modern colonial aggressions. This speech provides an Indigenous view of the enemy and allows discussants to understand through the words of their ancestors the “call to arms” against their aggressors. Discussion participants read excerpts from soldier’s memoirs of Pacific battles including *With the Old Breed* by Eugene Sledge and *Helmet for My Pillow* by Robert Leckie. Excerpts of the memoirs focus on the soldier’s thoughts and interactions with the enemy in relation to how they understood the enemy as different to themselves. The movie *Hell in the Pacific* (1968) which focuses on the dynamic between two enemies, Japanese and American, is viewed. Given the film was produced in the 1960s when race was at the forefront of discussion and conflict in the US, this film is particularly useful in examining the construction of race and the enemy in war films. A heritage site visit to The Last Command Site, allow participants to reflect upon the enemy through the Japanese perspective. Although misidentified, this tourist site is interpreted as the last stronghold held by the Japanese forces prior to the last counterattack, *Gyokusai*, which translates to “the crushing of the jewel,” in which Lt. General Yoshitsugu Saito encouraged the nearly 3000 remnant troops to attack the US in a banzai raid at night. The significance of this site as a tourist destination that draws hundreds of tourists per day is important to consider because for many it represents the final struggle of hand-to-hand combat between the Japanese soldier and the US enemy. It also foregrounds the Japanese Bushido code practiced by preceding generations of shogun wherein tenacity in battle and an honorable death by one’s own hand instead of capture by enemy was tantamount to the glorification of country and emperor.
The civilian

The theme seeks to understand and explore the complexity of civilians’ wartime experiences through multiple perspectives including age, gender, and ethnicity. The civilian theme presents both first-person and fictional accounts of WWII survival on Saipan. The first text, “We Drank Our Tears”: Memories of the Battles for Saipan and Tinian as Told by Our Elders, presents oral stories told by Indigenous elders to school-aged children who wrote and illustrated the oral stories. The stories provide historical context for those living on Saipan during WWII while the drawings serve as a link to contemporary understandings of war and survival. In many cases, the elder and child are related, with the child similarly aged as the elder at the time of experience. This serves to further connect the memory with contemporary understanding and collective history. The second text, Warriors in the Crossfire by Nancy Bo Flood, is a young adult historical fiction novel about a young Chamorro, Joseph, and his half-Japanese cousin, Kento, during the final months of WWII on Saipan. An historical fiction text provides additional perspectives, those of a half-Japanese son of a Japanese military official and the son of a local chief, to the experience of civilian survival. Since this is a young adult novel the text brings the benefit of a shorter read with historically accurate context. The third source is the poem We Shall Bring Forth New Life by Sadako Kurihara (1946). Sadako Kurihara survived the atomic bomb dropped on Hiroshima. She was a shopkeeper at the time but began writing graphic poetry about the bomb and aftermath becoming one of Japan’s most controversial poets. This piece is particularly poignant as it emulates the experience of civilians in caves on Saipan. These sources provide a window into civilian survival stories, identities related to survival, and collective understandings of local experiences. Textual experiences are coupled with heritage site visits instrumental to civilian survival.
Participants visit WWII shelter caves which serve to enrich their understanding of civilians’ experiences during the Battle of Saipan. Experiencing the cramped quarters, seeing the artifacts that still remain on the cave floor, and hearing the first-hand accounts are palpable reminders of civilians’ experiences. In addition to the WWII context, many caves contain ancient rock art that precedes the Spanish colonial period. Viewing and discussing Indigenous history as told through pictorial representation created by Chamorro ancestors serves to draw a line from the prehistoric past through to the present and solidify participants’ understanding of how their ancestors have used these caves over time for protection.

Memorialization

This theme examines how war is remembered and how it has been memorialized in the Mariana Islands. The theme seeks to explore how we remember, record, and sometimes discard the past. The premise that remembrance and memorialization is not apolitical is a theme examined by participants through the review of several sources. Participants read Indigenous cultural historian, Genevieve Cabrera’s history chapter “Battle for Saipan” in Underwater Archaeology of a Pacific Battlefield: The WWII Battle of Saipan (McKinnon and Carrell 2015). As this is one of the first historical contexts of the battle written by a Pacific islander, discussants exam how it is different to colonizers’ accounts of the battle and what happens when history isn’t “written by the victors.” Participants watch the Japanese film Oba: The Last Samurai (2011), which provides a counterview to the numerous US productions on the conflict of WWII in the Pacific. Oba explores the story of Sakae Oba, a captain of the Imperial Japanese Army who evaded capture for 16 months with 46 soldiers and nearly 200 civilians after US forces officially claimed Saipan. Whereas the film is based on a book by a US veteran who was part of the effort to
pursue Oba, the film is primarily a Japanese production. Interestingly, a 2011 article in *Japan Times* entitled “Japan’s renegade hero gives Saipan new hope,” was optimistic about the potential impact the film could make on Saipan tourism. Participants also consider Theo Hios, a Pacific Theatre veteran and his painting *Ambush at Saipan* which depicts the *Gyokusai* event at the end of the battle on Saipan. Hios enlisted in the Marine Corps and was made a combat photographer/artist, one of over 100 combat artists who served in the armed forces to record scenes of war. Participants consider the memorialization of war through depictions in art. Heritage site visits to underwater archaeological sites that include memorials for both Japanese and Korean (discarded or untold) participants on Japanese sites allow participants to view the wide range of memorialization and how memorialization of the past can be political. Participants also visit Banzai Cliff, the site of Japanese civilian suicides, to understand how this site has become a sort of pilgrimage for many. They also visit the National Veterans’ Cemetery. Both these visits serve to broaden participants’ understanding of memorialization, of the types of memorials present, for whom and by whom they are created, the ephemerality of memorials and offerings, and the difference between national cemeteries and places of commemoration.

**Conflict Heritage**

This theme focuses on the tangible remains of past conflicts. Artifacts are the objects that humans make, use, and are therefore a part of our past. Artifacts and associated heritage sites can be used as sources for better understanding our history because they offer a complementary and sometimes an alternative way of approaching the past, and at the same time can have several meanings. This session focuses on conflict artifacts and sites to explore how they inform our comprehension of war. Ancient warrior artifacts are included in the discussion session so that participants
may examine them; this serves to enrich their experience and understanding of the past through the archaeological record. It is particularly powerful for the Indigenous veterans to hold the weapons of their ancestors and reflect upon their meaning and the how the warrior’s weapons have developed over time to today. Participants also watch the 18-minute interpretive film *Battle of Saipan: WWII Maritime Heritage Trail* and read the guides, poster, and website for the WWII maritime heritage trail. This serves as background information for sites they visit during the field sessions. The warrior artifacts and sites are explored in five ways: 1) How they tell their own stories, 2) How they connect people, 3) How they mean many things, 4) How they capture moments, and 5) How they reflect changes. Heritage site visits and artifacts include: Aichi 1A3 Jake aircraft, Japanese freighter, US Sherman tanks, LVT A-4, WWII cave and rock art sites, H8K Emily aircraft site, Japanese freighter, Banzai Cliff, National Veterans Cemetery, The Last Command Site, Spanish-Chamorro battle site and cemetery, and prehistoric warrior toolkit artifacts.

**Scope, Organization, Setting and Partners**

The discussion programs are taking place during June 2017 and a second on during October 2017 on the island of Saipan. They are organized and coordinated by ECU, NMHC and the CNMI HPO, with local support from the CNMI Veterans Affairs Office. ECU faculty are cognizant that Saipan is a post-colonial, and some would argue still colonial, context in which outsiders have continued to bring experts and resources to the islands to tell the local community “what” and “how” they should do things. As such it was proposed to work “with,” not “on” or “for,” the community to develop these discussion sessions for two reasons: first, we do not want to impose colonial authority, and second, we want this program to be sustainable through participation and acceptance by the local humanities organizations and community. As such, the entire preparatory session and
both discussion programs are taking place on Saipan with the Saipan community.

The preparatory training to prepare local discussion leaders runs Monday through Sunday and the discussion sessions run Monday-Friday, evenings and all day Saturday and Sunday. Heritage site visits take place on Saturday (on the water) and on Sunday (on land) with a final regrouping and conclusion of the programs on Sunday afternoon.

The preparatory program and discussion sessions take place at the National Park Service American Memorial Park (AMP) which has a conference room and a large theatre for film screenings. AMP is a center for cultural activities on the island. Public forums, meetings, and education programs occur at this location and as such it is well-known. Hosting the discussions regularly in this space create a sense of community and sustainability among both the leaders and participants.

**Preparatory Program for Discussion Leaders**

Discussion leaders are selected based upon their background and interest in humanities, history, veterans’ affairs, and heritage tourism and their aptitude for public speaking. ECU project leaders work with local discussion leaders throughout the preparatory program. The program is seminar style discussion-based and content is divided by theme with ECU faculty leading training on individual themes. All discussion leaders are supplied with materials and read them in advance of the prep program. Materials include the humanities sources and additional secondary sources to provide historical and cultural background knowledge. Due to the intensity of time spent together and topics discussed, relationship-building activities are incorporated into each session. Trust, rapport, and openness are critical in terms of building a community of learners and leaders especially when discussing sensitive topics. Time is devoted to developing this community and activities include ice breakers to build
relationships between participants and listening without critique to encourage openness and trust.

A day is dedicated to each theme during which discussion of the relevant humanities sources serve to deepen the group’s understanding of the material and explore its relevancy to veterans. Each day also includes modeled source-based discussion techniques by ECU faculty. For example, each day begins with overarching open-ended questions of inquiry on thematic source content. ECU faculty facilitate discussion related to open-ended questions as well as model specific strategies for building on participant generated ideas, including generating additional open-ended questions for future discussion sessions. ECU faculty model active listening, or techniques to facilitate discussion, including restating participant questions or comments and extending points with guiding questions such as, Can you explain more of your thinking about ___? Tell us more about your experiences with ____, and In what ways does ____ extend our understanding of ____?. As sessions progress, ECU faculty reduce their roles as modelers and encourage leaders to practice discussion leading skills in mini_sessions with each other. ECU faculty scaffold and model as needed. Heritage site visits are incorporated so that leaders may prepare for discussion visits. The preparatory program also include logistics, advertising, and promotion so that local leaders can carry forward for the second session.

**Design, Content and Implementation of Discussion Groups**

It is hoped each discussion session constitutes 10-15 participants. Veterans have preference and extra spaces are filled with veteran families, active military, WWII civilian survivors, and families of WWII civilian survivors. The discussion program focuses on a theme per night, with five themes for five nights. The sessions last 2.5 hours and are delivered at AMP. Each theme session is run by one ECU faculty and a
local discussion leaders, so that local leaders can confidently facilitate the second successive discussion program.

Discussion materials are made available to the participants prior to the beginning of the discussion program via a hardcopy reader and digitally on the program website. The reader and website include an abbreviated summary of the two wars and the themes, the humanities content, and a handout per theme with the central theme, details of the humanities sources, and discussion questions. The handout allows the participants to formulate their thoughts ahead of time and aid in the development of discussion. Additional sources are available on the website for participants to follow up on the sources or battles including written sources, websites, and multimedia.

The discussion session begins as the leaders provide a brief introduction to the sources by discussing the historical and cultural background of the author(s), time period, and significance. Modeled and practiced source-based discussion facilitation techniques follow including, open-ended questions to initiate source-based discussions, facilitate discussion between and with participants, and relationship-building activities to encourage participants to relate their own experiences and identities to the sources and theme. The goal of each discussion is for participants to build and extend collective understandings of the themes using source-based discussions.

Participants attend Monday-Friday evenings to discuss themes and on Saturday to participate in heritage site tours on the water. Underwater sites range from partially-submerged in 3ft of water to 30ft of water so that all participants, swimmers and non-swimmers, snorkelers, and divers can participate. For those participants who chose to snorkel, equipment is provided. The second day of heritage site visits (Sunday) include van
transportation to key terrestrial heritage sites and a final post-processing session and ceremony at AMP in the afternoon.

The participants are awarded with a certificate and a specially-created challenge coin for their advanced knowledge in conflict heritage, which they may use to promote themselves as veteran heritage specialists. Additionally, their biography and testimonial are uploaded to the program website to a private page only they can access. The program website serves to develop a virtual network of discussion leaders and participants, resources for future sessions, and promotion through an informational video.

Author bios:

Dr. Jennifer McKinnon, an Associate Professor of History and Maritime Studies at East Carolina University has been travelling to and working with the Saipan community on heritage projects, specifically related to WWII on land and in the water, since 2007.

Dr. Anna Froula, an Associate Professor of Film Studies at East Carolina University is the faculty advisor for ECU’s chapter of Student Veterans of America has been studying, teaching, and publishing on war culture and veteran representation and issues for over a decade.
Dr. Anne Ticknor, an Associate Professor of Literacy Studies at East Carolina University has extensive literacy knowledge and education experience in working with child-adult learners spans 20 years. Her research focuses on the intersections of literacy, identity, and learning.
Naval History and Heritage Command-Underwater Archaeology in the Asia-Pacific Region

Robert S Neyland, PhD

Abstract

The Naval History and Heritage Command's Underwater Archaeology Branch (NHHC-UAB) is responsible for the management, preservation and archaeological research for the US Navy's sunken ship and aircraft wrecks. These naval wrecks range in date from the founding of the United States during the American Revolution to the present. The wreck inventory consists of 2,500 ships and 14,000 aircraft submerged globally and are within U.S. territorial, foreign and international waters. Under the customary practices of international law these are entitled to sovereign immunity, similar to present-day naval and military craft afloat. The US Navy wrecks and other sunken naval shipwrecks no longer defend their countries, but today represent significant cultural sites and war graves. Twentieth century wrecks from the World Wars might also represent hazards containing fuel and ordnance, which results in unique challenges. The NHHC-UAB has over 20 years of experience in established policy, laws, and regulations, as well as developing a variety of management tools and partnerships. Archaeological research, conservation, and exhibition are also central elements of our mission. The Asia-Pacific Ocean region holds a significant assemblage of the US Navy’s ship and aircraft wrecks. The management and preservation of these Navy wrecks are considered in this presentation, as is their potential for future research and partnership.

Key words: US Navy, Heritage Command, Asia-Pacific

Mission

The U.S. Navy established in the 1990s an active and multi-faceted program in underwater archaeology. The program is administered by Naval History and Heritage Command (NHHC) and carried out by NHHC’s Underwater Archaeology Branch (UAB). UAB drafts policy on United State sunken military craft, manages naval ship and aircraft wrecks as cultural
resources, oversees a scientific archaeological permitting program, leads archaeological recoveries and surveys, operates an artifact conservation and curatorial laboratory, and loans artifacts to qualifying institutions. All components of the program are dedicated solely to the specialized requirements of the unique data obtained through underwater archaeology conducted on sunken naval military craft. The program is located at the Washington Navy Yard, Washington, D.C. UAB formed out of the 1993 initiative by the Naval Historical Center (NHC), now the NHHC, to create a management plan and inventory for its shipwrecks and aircraft wrecks. UAB was incorporated into the NHHC in 1996, thus becoming the U.S. Navy’s sole program tasked to manage Navy sunken military craft. The 1990s initiative was the result of the Navy’s encountering several complex archaeological issues resulting from external requests to recover Navy ship and aircraft wrecks, necessitating the conservation of recovered artifacts through sophisticated conservation treatments. Prominent among requests for excavation and recovery was the French archaeological team excavating the Confederate privateer CSS Alabama that was sunk in French territorial waters. It was determined that wreck remained the property of United States even though it was financed by and built for the Confederate States of America and was sunk by USS Kearsarge within what is today French waters. U.S. representation and management of the wreck was placed under the U.S. Navy, and the United States and Republic of France established a cooperative scientific committee to oversee the archaeology (Neyland, 1996). The Navy was also confronted with several unauthorized and illegal recoveries of wrecks and artifacts, actions which challenged the sovereignty of the Navy and United States over its wrecks. Several of these would result in litigation and set legal precedent within U.S. courts.
The Navy's collection of sunken and terrestrial military craft total over 2,500 shipwrecks and 14,000 aircraft wrecks distributed across the globe (Figs. 1-2). These date from the Continental Navy formed during the American Revolution to those wrecks lost in the 21st century. Our cultural resources mission comprises preserving and interpreting the pivotal events of United States history and culture, but management also considers the potential threats posed to the public and environment from oil and other contaminants and unexploded ordnance. Masses of these sunken military craft are “war graves” and are the final resting places of sailors who gave the ultimate sacrifice in their nation’s service.

Fig. 1: World-wide distribution of U.S. Navy Wrecks (UAB, NHHC).
Period, Cause of Loss & Geographic Distribution. (All Figures are Estimates)

**PERIOD OF LOSS**

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>TOTAL LOSSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revolutionary War</td>
<td>43</td>
</tr>
<tr>
<td>Sept. 3, 1783 - June 18, 1812</td>
<td>10</td>
</tr>
<tr>
<td>War of 1812</td>
<td>68</td>
</tr>
<tr>
<td>Feb. 17, 1815 - April 12, 1861</td>
<td>43</td>
</tr>
<tr>
<td>Civil War</td>
<td></td>
</tr>
<tr>
<td>(USN)</td>
<td>545</td>
</tr>
<tr>
<td>(CSN)</td>
<td>225</td>
</tr>
<tr>
<td>April 9, 1865 - April 4, 1917</td>
<td>321</td>
</tr>
<tr>
<td>World War I</td>
<td>64</td>
</tr>
<tr>
<td>Nov. 11, 1918 - Dec. 7, 1941</td>
<td>195</td>
</tr>
<tr>
<td>World War II</td>
<td>774</td>
</tr>
<tr>
<td>Sept. 2, 1945 - Present</td>
<td>809</td>
</tr>
</tbody>
</table>

**CAUSE OF LOSS**

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>TOTAL LOSSES</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combat Losses</td>
<td>1,098</td>
<td>41.1%</td>
</tr>
<tr>
<td>Fleet Reduction or Targets</td>
<td>983</td>
<td>36.7%</td>
</tr>
<tr>
<td>Accident or Weather</td>
<td>593</td>
<td>22.2%</td>
</tr>
</tbody>
</table>

**GEOGRAPHIC DISTRIBUTION**

<table>
<thead>
<tr>
<th>AREA OF RESPONSIBILITY</th>
<th>TOTAL LOSSES</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFRICOM</td>
<td>21</td>
<td>0.8%</td>
</tr>
<tr>
<td>CENTCOM</td>
<td>2</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>EUCOM</td>
<td>188</td>
<td>7.5%</td>
</tr>
<tr>
<td>NORTHCOM</td>
<td>1,376</td>
<td>55.3%</td>
</tr>
<tr>
<td>PACOM</td>
<td>843</td>
<td>33.9%</td>
</tr>
<tr>
<td>SOUTHCOM</td>
<td>58</td>
<td>2.3%</td>
</tr>
<tr>
<td>WITHIN U.S. WATERS</td>
<td>1,484</td>
<td>59%</td>
</tr>
<tr>
<td>OUTSIDE U.S. WATERS</td>
<td>1,023</td>
<td>41%</td>
</tr>
</tbody>
</table>

Though generally reliable, data present in the Inventory is incomplete and imprecise. Not all entries have data reflected in all fields meaning that the totals for each table above will vary depending on the query posed.

Fig. 2: 1.U.S. Navy wrecks by historic period, cause of loss, and geographic distribution within Navy Commands (UAB, NHHC).

UAB cultural heritage management is compliant with U.S. laws and regulations such as the National Historic Preservation Act and the Sunken Military Craft Act (SMCA) and their implementing regulations. The period from 1994 to 2000 focused on military shipwreck and aircraft inventories and establishment of state and federal agreements that insured agency coordination in management efforts. In May 2000, NHHC, established a permitting program (32 CFR Part 767) to allow for controlled archaeological site disturbance insuring that archaeological research would result in published reports and artifact conservation and accountability. In October 2004, the Sunken Military Craft Act (SMCA) (Public Law 108-375, 10 United States Code 113 Note and 118 United
States Statutes at Large) was signed into law by President George Bush. The SMCA codifies U.S. and customary international law regarding sovereign immunity of sunken military craft; prohibits the unauthorized disturbance of craft owned or operated by a government on military non-commercial service when they sank; and authorizes the Secretary of the Navy to establish a permitting program to allow for controlled access to sunken military craft for archaeological, historical, or educational purposes. It applies to U.S. craft regardless of location and to foreign sunken military craft in U.S. waters. The prohibitions of the SMCA are applicable to U.S. citizens/nationals and foreign nationals over whom U.S. courts would have personal jurisdiction. It does not affect commercial fishing, laying of submarine cables, non-intrusive recreational diving, salvage of vessels that do not qualify as sunken military craft, and the routine operation of ships. In 2015, the NHHC replaced the 2000 permitting program with one pursuant with the SMCA. It is the overall policy of the Department of the Navy that its sunken and terrestrial military craft remain in place and undisturbed.

The inventory of ship and aircraft wrecks remains dynamic and after 24 years continues to be updated with additional information. The database is now incorporated into a geographic information system (GIS) that allows UAB to readily assess areas of effect for managing ship and aircraft wrecks both submerged and on land. This is useful when an entity or individual is conducting archaeological research or development activities within an area. In the latter case, GIS is essential when there are dredging and beach re-nourishment projects as well as the mapping of obstructions to navigation. The Navy withholds the precise location of wrecks to support in situ preservation. Despite many successes with the UAB inventory of wrecks, the locations of many of the Navy’s lost ships and
aircraft are unknown or have highly generalized locations or unverified locations. The U.S. Navy conducts its own survey projects and partners with interested researchers to locate these missing shipwrecks and obtain precise locations. Possessing the wrecks’ precise locations coupled with periodic site monitoring is essential to long-term site management.

The UAB maintains an archaeological conservation and curation Laboratory, located in the Washington Navy Yard, which serves as the Navy’s center of expertise on the conservation, treatment, and analysis of artifacts originating from sunken military craft. Conservation is intrinsically tied to archaeological research as artifacts recovered from an underwater environment require assertive conservation followed by an apt curation environment to insure their long-term stability. The laboratory serves as a curation space for over 3,000 artifacts and provides public access to the collection for research and analysis. Additionally, the program manages an artifact loan program of 11,000 artifacts which allows these to be displayed at qualified facilities nationally and internationally for the purposes of public education and academic research.

**Preservation through Education**

The NHHC, like other governmental agencies involved in cultural resources management, uses public outreach to foster preservation of sunken and terrestrial military craft and prevent disturbance while promoting study of the Navy’s heritage. The UAB disseminates information to the U.S. Navy, public, and academia via scientific and popular publications, lectures, the NHHC website, social media outlets, the artifact loan program, an active internship program, underwater archaeological exhibits, in-person visits and tours, and support of U.S. Naval Academy midshipmen and student research. The UAB internship
program typically has 6 to 10 interns within a calendar year and although many of these are unpaid, interns can use this experience to further their careers in archaeology, history or cultural resources management (https://www.history.navy.mil/get-involved/internships.html).

**Agency and Military Service Collaboration**

As a United States governmental agency, we work extensively with other federal agencies and the other military services. NHHC works closely with the Defense POW/MIA Accounting Agency (DPAA) in the accounting of missing Navy personnel and extensively with U.S. Army Corps of Engineers regarding sunken military craft within U.S. waterways. The Department of the Navy is a tremendously large and diverse governmental agency. Its primary mission is defense of the United States and the ability to exert force projection as necessary. In support of this mission, the Navy possesses assets in ships, personnel and other resources which include expertise in oceanography, remote sensing, ocean engineering, diving, and salvage. Some of these resources can be applied to management of Navy ship and aircraft wrecks when that work is in sync with training, education, and beneficial research. Some of the Navy assets UAB has relied upon Navy ships of opportunity as survey platforms, remote sensing equipment, salvage and diving expertise, inertion of ordnance, hydrographic services, and naval research laboratories for specific research and materials analysis.

**UAB Archaeological Research**

UAB conducts archaeological projects both within the continental United States and overseas. Project examples are varied in location and age and include surveys of WWII Normandy D-Day shipwrecks on the coast of
France, a scuttled Continental Navy fleet from the Revolutionary War in Maine, a U.S. Navy fleet from War of 1812 in Maryland, Civil War vessels such as the submarine *H.L. Hunley* near Charleston, South Carolina, surface ships USS *Cumberland* and CSS *Florida* in Norfolk, Virginia, and the WWI armored cruiser, USS *San Diego* sunk off New York. As the manager of the Navy’s sunken military craft, UAB provides significant input to other federal agencies engaged in complying with National Historic Preservation Act. Recent examples of large scale archaeological and conservation projects undertaken by other United States agencies include the U.S. Army Corps of Engineers necessity to remove two Civil War shipwrecks, USS *Westfield* in Texas and CSS *Georgia* in Georgia, to complete harbor channel deepening projects. UAB has consulted with cultural resources counterparts on a world-wide scale regarding ship and aircraft wrecks within foreign waters. Whenever possible, the U.S. Navy works to enhance collaboration with its international partners and local authorities in areas where the wrecks are located, as well as other United States government agencies, to promote the preservation of these fragile historical and cultural resources.

**UAB in the Asia Pacific Region**

Asia-Pacific waters and wrecks are more distant from the UAB base of operations, though no less important than our wrecks in the United States and other parts of the world. The U.S. Navy has an extensive presence throughout the Asia-Pacific region. This presence has allowed UAB to take advantage of ships of opportunity to conduct survey projects on Navy sunken military craft, placing an underwater archaeologist onboard during such projects, whenever possible. UAB undertakes direct archaeological
research to further the understanding of the Navy's history, tradition, and sacrifices through interpretation of underwater cultural heritage.

Collaboration with non-governmental partners plays a key role in identifying and assessing sunken military craft. Partner-sponsored projects, several of which will be discussed below, include the survey of two rare Devastator torpedo bombers lost in Jaluit atoll in the Marshall Islands, verification by U.S. Navy of submarines USS Lagarto and Wahoo found by private entities, and two expeditions led by Paul Allen with Vulcan, Inc. that surveyed the wrecks of the Guadalcanal naval battlefield and the recently discovered USS Indianapolis. There are many other groups and individuals dedicated to discovery of missing servicemen and preservation and interpretation of sunken and terrestrial military craft within the region. UAB-led projects include the search for the WWII submarine USS Pompano, believed lost near the Tsugaru Straits of Japan, and the identification and survey of USS Houston near Jakarta.

**Guadalcanal Naval Battlefield**

The Naval Guadalcanal campaign, along with the Battle of Midway, was a significant turning point for the war in the Pacific Theater. So many ships and aircraft were lost in the Savo Sound area between Guadalcanal and the Savo and Florida Islands that it was named Iron Bottom Sound by the Allies. In 2015, UAB was contacted by Robert Kraft, Subsea Operations Director of Paul Allen’s Vulcan Inc. offering to share the data they collected of their survey of Guadalcanal and shipwrecks of Iron Bottom Sound. Vulcan conducted the operation from the research vessel Octopus, using AUVs equipped with side scan sonar and with an ROV capable of collecting high definition video data. Water depths in the area ranged from 600-1,350 m. The sonar survey consisted of a Bluefin AUV
equipped with an Edgetech 2205 SSS rated to 1,500 m. The 10-day survey began on 19 January and ran 24-hour operations, covering 984 square kilometers. Twenty-nine wrecks, 7 debris fields, and several planes were discovered and mapped. Six vessels were positively identified, including: USS Astoria, USS Quincy, USS Vincennes, USS Northampton, HMAS Canberra, and USS Atlanta. The team used a 3,000 m-rated ROV to investigate USS Vincennes and USS Astoria. The survey resulted in precision mapping of the naval battle and the discovery of ships that had been previously unfound. Further investigation of these sites with ROV or manned submersible may enable researchers to identify the remaining U.S. and Japanese sunken military craft within the battlefield (Kozak, 2015).

**TBD Aircraft Jaluit Lagoon, Marshall Islands**

Although the events of WWII are only 75 years old, many of the ships, aircraft, and artifacts used during the war have become rare and sought after by museums. One of the U.S. Navy's prominent examples of this is the absence of any surviving Navy TBD-1 Devastator. We think of WWII combat aircraft as being mass produced but only 129 TBDs were ever built. Obsolete for combat purposes by the beginning of the war, TBDs nevertheless played a crucial part in the first WWII naval engagements including the Battle of Midway, where 37 TBDs were lost, and the Battle of the Coral Sea. Two of these rare aircraft were discovered in the Marshall Islands. The first TBD (BuNo 1515) was located at the relatively shallow depth of 18 m by divers Matt Harris and Lucy Martin during a 1997 Republic of the Marshall Islands (RMI) Historic Preservation Office (HPO) survey, funded by the U.S. National Park Service. In 2002, divers Matt Holly and Brian Kirk discovered the second TBD (BuNo 0298) in 40 m of water relatively close to the first aircraft (King, 2006).
The two aircraft were lost during the U.S. Navy's first offensive bombing mission of the war. TBD and SDB aircraft operating from Task Force 8, commanded by Vice Admiral William Halsey Jr. on USS *Enterprise*, and Task Force 17, commanded by Rear Admiral Frank Jack Fletcher on USS *Yorktown*, bombarded Japanese installations on the islands of Wotje, Kwajalein, Jaluit, Mili and Makin. The attack consisted of 11 TBDs and 17 SBDs. The two discovered TBDs were launched from USS *Yorktown* and given the mission to attack enemy installations on Jaluit Atoll. Their attack was hampered by rain squalls and low clouds that disoriented the aircrews. Exhausting all their fuel trying to locate the target, TBD Devastators BuNos 1515 and 0298 ditched together 10 km from Emiej (Imeji) on the western side of the Jaluit atoll. The six crewmen were unhurt during the landing, successfully evacuating their sinking aircraft, and making it safely to shore. They were eventually captured and endured the remainder of the war as POWs in Japan (King, 2006).

The aircraft discovered in Jaluit lagoon are to date the best-preserved examples yet discovered. In 2006, the U.S. Navy Mobile Diving and Salvage Unit II operating from the salvage ship USNS *Safeguard* and in conjunction with UAB and the not-for-profit group TIGHAR surveyed the wrecks to document the area in which they lay, determine their state of preservation and consider the feasibility of a future recovery of one of the aircraft. TIGHAR, which is the acronym for The International Group for Historic Aircraft Recovery, initiated the mission as an example of aviation archaeology and with a desire to eventually recover and conserve an archaeological example of an aircraft. TIGHAR divers worked side-by-side with Navy divers from *Safeguard* to evaluate the two aircraft and determine which would be the best candidate for recovery and preservation.
Dr. Robert Neyland, NHHC UAB, and Ric Gillespie, TIGHAR Executive Director, discussed the eventual recovery of one TBD for exhibit in the National Naval Aviation Museum (NNAM) with RMI government officials, including President Kessai Note in Majuro, RMI and the U.S. Embassy.

In terms of international cooperation and joint military/civilian operations, all in the interest of aviation historic preservation, the Devastator Project Evaluation Expedition was a landmark event. LCDR Charles “Chuck” Ehnes, USN and TIGHAR Dive Team Leader COL Van Hunn USAF (ret.) carried out the engineering survey of the two aircraft to determine integrity of both TBDs and assess the difficulty of a recovery. The survey collected small detached components to be used as sample material for scientific testing by the NNAM and by Texas A&M University’s Center for Maritime Archaeology and Conservation. Any future recovery will require a solid plan, adequate funding, and the collaboration between the RMI and U.S. governments.

**Survey for Submarine USS Pompano**

While conducting normal operations in the Tsugaru Straits, the U.S. Navy minesweeper USS *Guardian* (MCM 5) identified several uncharted wrecks, which were located approximately 2.3 nm northwest of Shiriya Zaki, Japan, in an estimated depth of 40 m. This location seemed to tie in with one reported in recently available Japanese archival records on a 17 September 1943 attack and probable sinking of a United States submarine by the Japanese Ominato Guard (Ominato Guard Squadron Report, 1943). USS *Pompano* (SS-181), which had been on patrol in the area and reported lost around this same time, was put forth as a potential candidate for identification (Fig. 3). In 2013, USNS *Salvor* returned to the area off Shiriya Zaki to conduct a survey and investigation of the targets.
located in 2012 in a coordinated effort between CTF 73, Fleet Survey Team (FST), and UAB. Utilizing side-scan sonar and remotely operated vehicle technology, the mission successfully investigated and discounted the two targets of interest and, in the process, located a new target as a possible submarine-like shipwreck. Between 15 and 19 August 2014, the USNS *Safeguard* conducted a survey and investigation of this wreck site. The 2014 mission utilized side scan sonar equipment, remotely operated vehicle technology, and Navy divers equipped with Go-Pro underwater cameras to obtain video for site analysis. The overall objective was to confirm or deny the wreck site as a submarine and further delineate its identification as USS *Pompano* or otherwise. It was quickly determined that the wreck at the site delineated in the historic records was a badly damaged merchant or fishing vessel. The Japanese reports do note that they could not confirm contact with a submarine on the bottom, although they reported oil gushing from the site. It is possible the reported oil came from the wreck investigated in 2014 and the depth charging caused the leakage. Although this mission gathered negative information regarding the location of *Pompano*’s loss, it did determine that it was not at this location. The mission also provided experience surveying in Japanese waters and developed protocols for Japanese and U.S. cooperation in future searches for missing U.S. Navy ships (UAB, 2014).

Fig. 4: USS *Pompano*, December 19, 1942 (Photo Archives, NHHC).
Many of the WW-II wrecks of the Java Sea campaign have been tragically lost to unauthorized scrap metal salvage. This is a loss to archaeology and history, but of greater concern is the desecration of war graves and the likely damage to the environment from the dispersal of fuel and ordnance. USS Houston has been largely saved from this fate for now through cooperation between the Governments of Indonesia and the United States. USS Houston was launched in 1929 as a light cruiser (CL-30) due to her thin armor, but in 1931 was designated a heavy cruiser (CA-30) due to the provisions of the 1930 London Naval Treaty that declared ships with 8-inch main guns to be heavy cruisers (League of Nations). The wreck of Houston lies in the Sunda Strait near Jakarta. The Royal Australian navy light cruiser HMAS Perth (D29) lies a few miles distant. Both ships were lost in battle at Sunda Strait, March 1, 1942, immediately following the Java Sea Campaign. Both ships’ crews bravely battled overwhelming odds before succumbing. They sunk in what are now Indonesian waters -- Houston with almost 650 Sailors and Marines, Perth with 353 Sailors (UAB, 2014).

Reports of possible scrapping of the wrecks of Houston and Perth circulated in the United States and Australia during 2013. In 2014, a U.S. Navy and Indonesian joint naval exercise, Cooperation Afloat Readiness and Training (CARAT), provided an opportunity to discover firsthand the condition of Houston. A joint Dive Exercise (DIVEX) between the United States Navy and the Indonesian Navy was established to survey the site. The DIVEX was intended to provide the U.S. Navy with a better understanding of the ship’s state of preservation and verify or discount the reported damage resulting from unauthorized salvage efforts. The mission included a wreath-laying ceremony to commemorate the significant loss
of life associated with the sinking of the vessel. NHHC sent UAB archaeologist Dr. Alexis Catsambis to assist in relocating and identifying the wreck and oversee the site documentation carried out by U.S. Navy and Indonesian Navy divers. The wreck was positively identified as that of Houston by comparing the data and imagery from the dives with documentary records such as ship’s plans, photography and written records (Fig. 4). It was found that indeed the wreck had suffered damage from unauthorized and systematic disturbance, including the removal of hull rivets and lifting of the metal plating and associated artifacts from the wreck site. Ordnance also appeared to have been purposefully collected and situated in heap for likely recovery (Fig. 5). Some ordnance of the calibers carried on Houston and on Perth was later found at a Jakarta scrap yard. This represented salvage on a small scale and not the wholesale destruction wrought by ships designed to break and recover wrecks (UAB, 2014; U.S. Pacific Command, 2017). The latter had either entirely or mostly removed such famous Battle of Java Sea wrecks as HNLMS De Ruyter, HNLMS Java, HNLMS Kortenaer, HMS Exeter, HMS Electra, HMS Encounter, HMS Repulse, HMS Prince of Wales, and USS Perch.
Fig. 4: USS Houston Site plan identifying features and site damage observed during data analysis phase - (A) represents a bird’s eye view of the port exposed side of the vessel, while (B) represents a profile view of the hull as it rests on the seafloor (Alexis Catsambis, UAB, NHHC).

Fig. 5: Ordnance piled on wreck of USS Houston (UAB, NHHC).
The 2014 documentation of USS *Houston* yielded close-up video and still imagery of sections of the ship. What was still lacking was an overall view of the entire wreck; that information could only be provided by a detailed survey of the wreck with side scan sonar and a multi-beam echosounder system. In December 2016, this was accomplished by the Australian National Maritime Museum and the National Research Centre of Archaeology Indonesia/Pusat Penelitian Arkeologi Nasional when they conducted a remote-sensing survey with multi-beam sonar of the wreck sites of *Perth* and *Houston*. These governmental agencies kindly allowed NHHC UAB to review the data thus providing Navy archaeologists their first full view of the wreck site and confirming that the wreck remains largely intact. *Perth*, however, had suffered significantly at the hands of scrappers.

This year marked the 75th century anniversary of the Battle of Java Sea and in March 2017 the loss of *Houston* and *Perth*. This event was commemorated by the nations that comprised the American-British-Dutch-Australian Fleet. NHHC and partners from Indonesia, the United Kingdom, Australia, and the Netherlands, created a permanent exhibit to commemorate the 75th anniversary of the World War II Battles of Java Sea and Sunda Strait at the Maritime Museum Bahari in Jakarta, Indonesia.

The U.S. Navy views the sea as a fit and final resting place for American Sailors who sacrificed their lives for their country. Unauthorized disturbance of U.S. Navy wrecks containing the remains of American Sailors is a desecration of such grave sites. The NHHC is working with partners in the region to determine the best course of action for preserving USS Houston and other U.S. Navy wrecks within the region. UAB hopes
to have an increasing focus on identification and verification of U.S. Navy sunken military craft in the Asia-Pacific region.

References


Archaeology Branch, Naval History and Heritage Command, Department of the Navy, Washington Navy Yard, D.C.


Biography

Dr. Robert S. Neyland is the Head of the Underwater Archaeology Branch for the Department of the Navy. He is Project Director for the raising and conservation of the Confederate submarine H.L. Hunley. The Hunley project received the only award ever given by the National Trust and Advisory Council on Historic Preservation for partnership. He also received in 2002 the Don Turner Award from USS Constitution Museum for his work on Hunley. During his career he has worked on a variety of shipwreck sites including a Bronze Age shipwreck in the Mediterranean, post-medieval wrecks in the Netherlands, and numerous shipwrecks in the Caribbean and North America. Recent field projects include U.S. Navy ships from the anti-slavery patrol, WWII wrecks from D-Day, and American Revolutionary War naval shipwrecks.
Naval shipwrecks in Indonesia

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Abstract

This paper examines naval heritage in Indonesian waters, focusing on HMAS Perth (I) and other Allied vessels that sank in the Java Sea and the Sunda Strait in 1942, and argues for a re-consideration of what we understand by value and loss as it relates to this heritage. While the recent (2013-2017) illicit salvaging of these wrecks for scrap-metal has prompted international criticisms, an examination of Indonesia’s colonial and post-war history serves to contextualise what the international community sees as ambivalence towards these wrecks, while also suggesting a wider apportioning of responsibility. Furthermore, a historical perspective demonstrates that the salvaging of objects from HMAS Perth dates to the 1960s. Some of these activities, including David Burchell’s 1967 expedition and more recent interactions with the site by divers and other stakeholders, can be understood as ‘cultural impacts’. But other early salvaging, such as that which resulted in the profit-motivated recovery of HMAS Perth’s two bells, can be seen as an early precursor to the larger-scale salvaging we see today. The paper concludes by advocating a new approach that accepts neither non-disturbance nor the inevitability of loss, but instead prioritises the advance, judicious removal of symbolic objects from threatened warship wrecks.

Key words: Indonesia, HMAS Perth (I), Sunda Strait, Java Sea, USS Houston, World War II, illicit salvage, protection and preservation, naval heritage, bells.

Introduction

During World War II (WWII), hundreds of ships (and lives) were lost in naval battles in the waters of the Asia-Pacific as Allied forces sought to prevent or delay the arrival of the Japanese. The recent industrial-scale salvaging of wrecked Allied vessels in the Java Sea and the Sunda Strait has brought these wrecks to the attention of the international community,
and prompted renewed calls for an urgent rethink on how to protect and preserve naval heritage in Indonesia. This paper examines one of these wrecks, that of HMAS Perth (I),\(^1\) which, together with USS Houston,\(^2\) sank on 1 March 1942 after unexpectedly encountering a large Japanese imperial fleet in the Sunda Strait. Since then, efforts to protect and preserve HMAS Perth have been complicated not only by issues of ownership, access and responsibility, but also by contradictory understandings of how naval wrecks are valued in Indonesia.

My intention here is to expand the notion of what constitutes value beyond the apparently irreconcilable dichotomy of ‘wreck as heritage’ or ‘wreck as commodity’, and to do so by focusing on objects salvaged from HMAS Perth. In particular, I focus my attention on the ship’s two bells, both of which were illicitly salvaged from the wreck in the 1960s or 1970s, and, following negotiations, returned to Australia. These bells are now housed in public safekeeping institutions, at the Australian War Memorial (AWM) in Canberra and at Perth Town Hall. As the ‘soul’\(^3\) of the ship, the bells remain important touchstones for survivors and descendants while also providing opportunities for new audiences to encounter, in a material way, HMAS Perth. How, and by whom, are the complex and competing notions of ownership and value – of wreck as historical informant, war grave,\(^4\) or commodity – ascribed? Which of history, memory, or money should take priority, and does this change over time? Who is invested, who is responsible, and what are the consequences of these diverging valuations and concepts of ownership? How else can these wrecks be valued?

To address these questions, I consider the recent (2013-2017) illicit salvaging of HMAS Perth and other Allied wrecks in Indonesian waters, particularly the international community’s criticisms that Indonesia has neither the capacity nor the willingness to protect and preserve these
wrecks. My examination of Indonesia’s colonial and wartime histories offers an alternative perspective that calls into question these international criticisms and suggests a wider apportioning of responsibility.

I then turn to the re-discovery of HMAS Perth in 1967, and the subsequent salvaging of the wreck by Australian diver David Burchell and others. Within this context, I demonstrate that the recent illicit salvaging constitutes not a departure from, but a continuation of, previous interventions and interactions with these underwater sites. At the same time, I contend, some early interventions – namely Burchell’s – can be better characterised as ‘cultural impacts’, to use a term from McKinnon. I also account for the environmental value of wrecks such as HMAS Perth, which was once home to an abundance of coral reefs and marine animals, and the resulting benefits for local communities.

The paper concludes by asking whether loss is inevitable as part of the ‘process’ of heritage, and considers the extent to which stakeholders’ aversion to such loss is based on what Cornelius Holtorf calls a paradigm of conservation. Rejecting this, I advocate for a new approach that accepts neither non-disturbance nor the inevitability of loss, and instead prioritises the advance, judicious removal of symbolic objects from threatened warship wrecks.

**Illicit salvaging in Indonesia, 2013-2017**

In 2013, reports emerged of a salvage barge equipped with a ‘massive’ crane and claw above the wreck of HMAS Perth. Known as a grab dredger or a claw barge, its purpose was commercial: the sheer quantity of metal on a naval ship means that a salvaged wreck can be worth up to AUD$1 million. By 2017, Australian and Indonesian maritime archaeologists revealed that only approximately 40 percent of HMAS Perth remained *in situ*, with evidence of large-scale salvage on the site.
The destruction of HMAS *Perth* is indicative of a broader trend in Southeast Asia: illicit salvagers are becoming increasingly audacious and sophisticated in their activities.\(^\text{10}\) In the Java Sea, Allied wrecks have been not only damaged but completely removed.\(^\text{11}\) The wrecks lay close to one of Indonesia’s largest naval bases, and suspicious activity – not to mention visible environmental impacts such as oil spills – is unlikely to have gone unnoticed by passing marine craft.

Recent illicit salvaging activities are non-state affairs, undertaken covertly and without seeking permission. Industrial surface platforms enable the armed, international crew to remain above water and monitor for the presence of authorities while the metal is pulled up indiscriminately from the seabed.\(^\text{12}\) No regard is shown for the presence of human remains, symbolic objects, unexploded ordnance or oil tanks.

When news broke about the missing Dutch wrecks in the Java Sea, head of Arkenas (*Pusat Penelitian Arkeologi Nasional*, or the National Archaeological Centre of Indonesia), Bambang Budi Utomo, said:

> “The Dutch government cannot blame the Indonesian government because they never asked us to protect those ships. As there was no agreement or announcement, when the ships go missing, it is not our responsibility.”\(^\text{13}\)

Chief of Indonesia’s Navy Information Office, Colonel Gig Jonias Mozes Sipasulta, confirmed Indonesia’s view that foreign governments should have done more to protect the wrecks:

> “The Indonesian navy cannot monitor all areas all the time. If they ask why the ships are missing, I’m going to ask them back, why didn’t they guard the ships?”\(^\text{14}\)

Even though Indonesia was not directly implicated, its initial defensiveness was seen as indicative of local attitudes that wartime naval wrecks were the heritage – and therefore the moral and financial
responsibility – of the flag States. Indonesia’s eventual acquiescence to calls for an international investigation into the missing Java Sea wrecks did little to mitigate broader perceptions that this issue, and the threats posed to other wrecks in Indonesian waters, was a low priority.

Historical context
Indonesia’s response to the missing wrecks clearly failed to meet international expectations. However, a historical perspective can provide an alternative narrative in which these wrecks are re-considered in light of Indonesia’s post-war, post-colonial priorities. While such a perspective does not absolve Indonesia, it does, I believe, go some way towards explaining Indonesia’s ambivalent attitude towards ‘those ships.’

The Indonesian archipelago has been at the centre of inter- and intra-regional maritime activities for centuries. Europeans began participating in maritime trade and commerce from the 16th century onwards. By the early 19th century the Dutch had extended their colonial reach across the Dutch East Indies, with power centred in Java. This authority was threatened during World War II when these archipelagic waters became the final staging ground for Japanese ambitions in Asia.

In mid-February 1942, the colony was under pressure on all sides. Singapore had fallen; days later, Darwin was heavily bombed. Parts of Kalimantan, Sulawesi, Sumatra and Timor were already under Japanese occupation. Desperate to retain Java, Allied forces assembled a fleet of ships under American-British-Dutch-Australian (ABDA) command. During the Battle of the Java Sea on 27 February 1942, two Dutch cruisers and three destroyers either sank or were crippled. Two surviving ships – HMAS Perth and USS Houston – sailed to Batavia’s main port of Tanjung Priok to re-fuel, but were almost immediately ordered to continue west through the Sunda Strait. Here they encountered more Japanese forces.
Out-numbered, HMAS *Perth* was hit by torpedoes and sank in the early hours of 1 March; USS *Houston* succumbed shortly after. Between the two ships, over 1000 lives were lost. Those who survived the Battle of the Sunda Strait were taken as prisoners of war, and endured years in Japanese war camps.\(^{17}\)

Japanese occupation of the Dutch East Indies (1942-1945), and of other former European colonies in Southeast Asia, was followed at the war’s conclusion not by a return to the colonial paradigm of the past, but by the mobilisation of anti-colonial, nationalist movements throughout the region. During the Japanese occupation, support for local independence had strengthened at the same time as colonial powers experienced a decline in their authority and influence. Dutch attempts to re-establish control after WWII were met with resistance by Indonesian nationalists, who declared independence on 17 August 1945. Even though the sunken ships of the ABDA fleet lay within the new nation’s archipelago,\(^{18}\) the memory of these wrecks receded as Indonesia turned its attention to modernisation and the need to define a unifying national identity. These ships and their crew had been lost in the fight to achieve the Allies’ objectives, not local independence. In the new post-colonial environment, these ships became neglected symbols of a past era in which colonial authority dominated. Indonesia’s priorities lay elsewhere.

Compounding the neglect were delays in the introduction of a global regulatory framework for the protection and preservation of underwater cultural heritage. Despite the loss of hundreds of naval ships in many different jurisdictions, the attention of the international community was focused on addressing the military destruction and looting of cultural property that had occurred during the war. In a trend that continues to this day, terrestrial heritage sites and objects were the subject of greater
regulation and protection through the introduction of international conventions\textsuperscript{19} and domestic legislation, while underwater heritage lagged behind. It would be many years before the regulation of underwater cultural heritage caught up with its terrestrial counterparts with the introduction of the 2001 UNESCO \textit{Convention on the protection of the underwater cultural heritage}. This Convention seeks to strengthen legal protection, international cooperation, awareness-raising and capacity-building for underwater cultural heritage worldwide.\textsuperscript{20} To this day, the number of underwater sites inscribed on the World Heritage list is, to use UNESCO’s own words, ‘derisory when compared to the number of sites on land.’\textsuperscript{21}

\textbf{Re-discovering HMAS Perth}

It was within this context that Allied naval wrecks in Indonesia, including HMAS \textit{Perth}, were neglected for decades. In the 1950s and 1960s, advances in diving technology, combined with rising concern among the flag States about prospects for preservation, prompted a re-discovery of, and re-engagement with, the wrecks. By the 1960s, both individuals and governments were expressing an interest in locating and salvaging the HMAS \textit{Perth} wreck, with Japan reportedly approaching Indonesia:

…”for permission to salvage the \textit{Perth}, along with some of their own vessels which were sunk in Indonesian Territorial Waters, to help pay their War Reparation debts. But the Australian Government, outraged at the thought of any desecration to this, an Australian War Grave, had vigorously resisted the move, and the Japanese, bowing to public opinion, promptly dropped the matter.”\textsuperscript{22}

Japan’s interest can be contextualized with reference to the post-war popularity of scrap metal as a commodity in some parts of the Pacific. In this period, for example, scrap metal was the second largest commodity in the Marshall Islands.\textsuperscript{23}
In 1967, Australian diver David Burchell embarked on his own private mission to locate, and recover objects from, HMAS *Perth*. His desire to find the *Perth* was sparked by its increasing vulnerability to:

“…those competent but very unethical fellows, the diving pirates. Mainly outlaw divers, these characters, for the sake of the quick quid, are always willing to take a calculated personal and legal risk to recover non-ferrous metal from sunken ships. Completely ruthless, they blast and rip with explosives and underwater cutting gear, and are quite oblivious to the desecration and ruin they leave behind. Diving pirates are shunned by most commercial and sporting divers around the world, but nevertheless many are the historically priceless artifacts that have been melted down and sold to the scrap merchants by these looters.”

In the absence of any legislation, and clearly wanting to avoid being labelled a ‘diving pirate’ himself, Burchell had consulted with survivor groups in Australia, as well as Indonesian and Australian government and military representatives in Canberra and Jakarta. While Burchell’s salvaging contravened maritime traditions, which preclude the disturbance of underwater war graves, he did not breach any domestic or international laws.

Official support for Burchell fluctuated, and, ‘whilst the Australian and Indonesian governments did not actually block the project, neither showed much enthusiasm.’ Indonesia provided a derelict boat – a 90-foot Russian sloop, the *Aries* – and one new staff member, Captain Sumantri from the Indonesian Navy, who was a ‘tremendous addition’ to the team. Meanwhile, the Australian Government ‘sat on the fence waiting to applaud if the mission was successful, but thumbs down at the ready in case of failure.’ In Jakarta, the Australian Embassy’s support appears to have wavered, and it wasn’t until the expedition was showing clear signs of success that Burchell found himself the recipient of four tins of condensed milk – a sign he was back in favour.
Burchell located the wreck in May 1967, some 25 years after she sank. To do so, he had relied heavily on the knowledge of local fishermen in Banten Bay, who were adept at identifying wreck sites by the presence of large schools of fish and sea birds. Without their assistance, efforts to find the wreck may have taken many more years, as Perth lay about seven miles off course from her final reported bearing.

Although he had political support and had consulted with survivor groups in Australia, Burchell recognised the murky moral terrain he occupied. In the first of 30 solo dives on the wreck, he experienced a strong sense of transgression:

“As my mind cleared there came a feeling of almost overpowering awe at the knowledge of where I was, together with a strong sensation of trespass which made me doubt my right to be there. But this was a natural reaction, and was as it should be, and I knew that if I were going to finish the job this psychological hurdle had to be overcome like any other problem.”

Conditions were often challenging, with poor visibility, strong currents and an increasingly aggressive shiver of sharks. The wreck was also home to curious gropers, octopodes, dozens of green turtles and hundreds of varieties of fish. These dives confirmed what the local fishermen already knew: HMAS Perth was ‘splashed with living colour; covered with the innocent, unprejudiced rainbow growth of animal and vegetable in harmony affirming indefeasible life-to-come.’ On the starboard side of the bridge, Burchell observed:

“…a magnificent spray of Gorgonia coral. It was over six feet across and because of the depth it looked grey in colour, but in fact was probably orange or dark red. I was always careful not to damage it, for although the ship is now still, and the mortal remains of the men she took down with her have long since gone, I felt the coral spray represented a living tribute to the memory of both the ship and the men.”
This thriving marine eco-system offered economic opportunities to local fishermen, while the presence of birds hunting the waters around the wreck also provided useful navigational references for coastal communities and seafarers.

Burchell’s main objective in diving HMAS *Perth* was to recover the ship’s bell and gift it to the AWM ‘in commemoration to the men who died during this battle which was one of the most courageous in Australian naval history.’ Burchell knew that bells are amongst the most symbolic of objects on a ship:

“A warship’s bell is something that all onboard are familiar with. In days gone by they were the ‘heart-beat’ of a ship’s routine, marking the passing of watches and other important ceremonies such as the raising of morning colours when in port or at anchor. Every member of a ship’s company is familiar with its ring and as such these bells are important artefacts which, long after a ship is lost in action or decommissioned, form a ‘touchstone’ for former shipmates and relatives of those who served, fought and died in them. We are fortunate to have both of *Perth*’s bells in safe custody as a visible reminder of the crew’s courage and sacrifice.”

Burchell recovered around 24 objects, which were in ‘remarkably good condition considering that they have been underwater for twenty-five years.’ Most were formally gifted to the AWM on 11 November 1967 at a handover ceremony attended by Burchell, Captain Sumantri, the Indonesian and American Ambassadors to Australia, and around 100 members of the ex-HMAS *Perth* Association from around Australia.

*The bells of HMAS Perth*

However, Burchell’s repeated attempts to locate the ship’s bell were unsuccessful, and he surmised that ‘if the bell is still with the *Perth*, it’s probably well below the mud and sand.’ What Burchell had not realised was that *Perth* was carrying not one but two bells when she sank: a working bell, stored for daily use above deck; and an ornate ceremonial
bell embellished with two decorative circles of oak leaves on the top and bottom edges, and probably stored below deck. Each of these bells bore the engraving ‘HMS Amphion 1935’; upon transfer to the Royal Australian Navy (RAN), the reverse side of each bell was engraved with ‘HMAS Perth 1939’.

Fig. 1 (Left): HMAS Perth’s working bell, 1974. (Bob Morrison)
Fig. 2 (right): HMAS Perth’s ceremonial bell, 2010. (WA Museum)

The working bell

Some seven years after his expedition, Burchell received word from Captain Sumantri in mid-1974 that a bell from HMAS Perth had turned up in a private salvage yard in Indonesia. ‘Afraid the bell would be sold to foreign interests or “disappear”’, Burchell flew to Jakarta to meet with the head of the salvage firm, General Soehardi (ex-Indonesian military). Despite protracted negotiations, Soehardi was unwilling to release it without payment. Burchell refused, arguing that Australia had already paid for the bell ‘with the lives of 353 men that went down with the ship and another 100 who died in POW camps.’
In frustration, Burchell sought assistance from the Australian Embassy in Jakarta in August 1974. Although the Embassy knew the bell was not Soehardi’s to sell in the first place, they also recognised that engaging in technical arguments about the legalities of ownership would not ensure the bell’s return. For practical reasons, therefore, the Embassy agreed to give the salvage company a Hercules class 17 foot aluminium diving boat worth about AUD$3,000. In exchange, the bell was handed over to the Embassy in a small ceremony on 21 November 1974.

Fig. 3: Staff at the Australian Embassy in Jakarta celebrating the handover of the HMAS Perth’s working bell, 21 November 1974. From left: Wing Commander Bill Richardson, Assistant Defence Attaché Robert (“Bob”) Morrison; and Naval Attaché M A MacK. (“Nobby”) Clarke. Source: Bob Morrison. (Bob Morrison)

This ‘reciprocal exchange’ had a precedent: Soehardi had recently presented the US Ambassador with a bell from USS Houston, which had been salvaged in 1973. In return, the Ambassador had given Soehardi’s salvage firm a large quantity of surplus diving gear.

On 26 November 1974 the bell was flown to Canberra, where it underwent months of conservation at the AWM. The bell is now displayed in the WWII Singapore gallery along with a selection of relics.
recovered by Burchell; a small wall panel acknowledges his efforts in recovering the relics.

Fig. 4: HMAS Perth’s working bell on display at the Australian War Memorial, accompanied by a selection of objects salvaged by Burchell, July 2017. (Natali Pearson)

**The ceremonial bell**

The whereabouts of the 50-kilogram ceremonial bell remained unknown until the mid-1980s, when, in January 1985, the RAN was ‘offered a bell recently recovered by a diver from a wreck of HMAS Perth… This bell apparently would have been in a trophy cabinet or some similar prominent display area on the ship rather than in actual use.’ The RAN passed the offer to the AWM, but it was declined for three reasons: the asking price of AUD$10,000 was too high; the AWM was already in possession of the working bell from HMAS *Perth*; and, most importantly, questions about the
‘legality of the diver even owning the bell.’\textsuperscript{56} Despite expressing concerns that the bell’s salvage might constitute ‘theft’,\textsuperscript{57} the AWM did not rule out the possibility of accepting the bell ‘as a gift.’\textsuperscript{58}

However, the seller found a willing buyer in the City of Perth. As Michael Agapitos Michaels, then Lord Mayor of Perth, noted,

“\textquote{The bell of course came from a War Grave and as such should not have been disturbed but when I was approached the bell was on land and offered for sale and it seemed to me that the final home for the bell should be its namesake city where its significance would be appreciated.”\textsuperscript{59}

\textbf{Fig. 5: HMAS Perth’s ceremonial bell, circa 1984, with other salvaged objects. (David Barnett)}

The ceremonial bell was thus acquired by the City of Perth in the mid-1980s, with QANTAS donating transport back to Perth in a wooden crate. The bell was presented by Lord Mayor Michaels to the City of Perth in 1986 at a ceremony attended by HMAS Perth survivors.\textsuperscript{60} In 2010 the bell underwent six months of restoration at the Western Australian Museum\textsuperscript{61}
before being returned to the foyer of the Perth Town Hall, where it remains today.\textsuperscript{62}

It is not known whether the two bells were still on the ship when Burchell dived it in 1967 – and he had simply been unlucky in his attempts to locate them – or whether they had already been removed by then. Either way, it is clear that Burchell was not the only one working the site in the 1960s and 1970s. Decades later, in August 2012, marine salvager David Barnett gave a number of HMAS \textit{Perth} plates to the WA Maritime Museum.\textsuperscript{63} Barnett explained that he had recovered the plates, and other objects, from the wreck in the late 1960s and 1970s when working as a subcontractor to a marine salvage firm, PT \textit{Antasena}, which was operating under a permit issued by the Indonesian Government. The principal of this firm was General Soehardi: the same Soehardi who was in possession of HMAS \textit{Perth}’s working bell in 1974.

Barnett’s account of Soehardi’s salvaging activities, documented by a curator at the WA Shipwrecks Museum, revealed that systematic, profit-driven salvaging of the wreck had been taking place not just for years but for decades. Said Barnett, ‘by the time [I] got there the propellers were gone and work was well underway… the chief diver Harry had already got one bell from the \textit{Perth} which was sold to the Australian War Memorial.’ Barnett knew there were two bells on board, and told the divers ‘If you find the Quarterdeck bell at X turret I will give you 10 million Rupiah’. They found it and on recovering it he made the payment.\textsuperscript{64}

My research demonstrates that an Indonesian salvage company, operating under General Soehardi, was involved in the salvage of both bells from HMAS \textit{Perth}, and also a bell from USS \textit{Houston}. This company’s involvement in the salvage of other wartime wrecks in Indonesian waters is unknown, but cannot be ruled out. Unlike Burchell’s
salvaging, which was motivated by a desire to commemorate and repatriate, the salvaging activities that resulted in the recovery of the ‘bells of the Sunda Strait’ (to use the phrase Burchell gave to his book) were clearly profit-driven. In each case for which we have evidence – HMAS Perth’s working bell, exchanged for a AUD$3,000 boat; her ceremonial bell, sold to the City of Perth; and USS Houston’s only sunken bell, exchanged for costly diving equipment – these symbolic objects were recovered with the intention of profiting from them.

**Cultural impacts**

Burchell’s early salvaging activities, and some subsequent interventions on the HMAS Perth site, can be understood as ‘cultural impacts’. This is a term developed by Jennifer McKinnon to explain interventions on underwater sites, and although her research pertains to a WWII naval battlefield in the Northern Mariana Islands, it is also of relevance in relation to HMAS Perth.

McKinnon identifies ‘cultural impacts’ as: acts of memorialisation; looting and collecting of souvenirs; the movement of artifacts by visitors to the sites; tourist service impacts; and anchor and mooring damage. All of these have potential consequences for the historical and archaeological integrity of underwater sites. In some instances, McKinnon’s research suggested that underwater objects associated with a wreck site had been moved so as to enhance on-site memorials – for example, the encircling of a plaque with gas cylinders. She also observed that some sites had been re-configured to enable better photographic opportunities, or vandalised in a quest for personal memorialisation. In behaviour that mimics the ‘taking or making’ that occurs at terrestrial heritage sites, McKinnon also found evidence that some visitors made contributions
(such as sake bottles and wooden stupa) to underwater sites, while other visitors removed, rather than contributed, objects.

Many similar cultural impacts are evident on the HMAS Perth site – the removal and repatriation of objects by Burchell, for example, or the ‘flying’ of the Naval Ensign on the wreck by visiting divers. There is also evidence of personal memorials and plaques on the wreck, as well as anecdotal reports indicating that foreign recreational divers have removed souvenirs from the Perth and other Allied war graves.

When understood as a cultural impact, interventions such as these can serve to complicate, if not subvert, the current dichotomy of wreck as in situ heritage or wreck as salvaged commodity. Although cultural impacts are often framed negatively by archaeologists and heritage managers, McKinnon suggests that they can ‘also be examined as behaviour that reflects various stakeholders’ values and attitudes towards heritage sites’, and that they therefore warrant inclusion in research and management discussions. According to McKinnon, to understand value, and its manifestation in behaviour and activities, the individuals and groups that are engaging with heritage places must be identified (a task that is complicated by the fact that such stakeholders change over time).

As with other wartime wrecks, HMAS Perth’s stakeholders include survivors and descendants; recreational divers; government and military representatives both foreign and local; and fishermen and coastal communities. These individuals and groups engage in different ways, at different times, depending on their association with the wreck. Underpinning many of these perspectives is an aversion to further loss. For the Australian Government and the RAN, HMAS Perth is a potent representation of both Allied resistance and the military might of individual nations. Lost in service, it is a historic relic that necessitates respect, as
well as a memorial to individual and collective wartime experiences. The sanctity and emotional significance of the sites is further strengthened by the presence of human remains. This conception of value is both political and moral, and is predicated on preservation, protection and non-disturbance. For survivors and descendents, the site is a place to grieve, reflect, and recall lost friends. They may join foreign military representatives at formal commemorations and ceremonies, such as the placement of floral wreaths in the water on significant anniversaries. The wreck’s historical and archaeological significance is measured by maritime archaeologists from Australia and Indonesia, who undertake semi-regular, systematic surveys both above and in the water. For the Indonesian Government and Navy, the site is a place at which international scrutiny and criticisms have become focused. For local communities, the wreck’s ability to support a diverse underwater ecosystem provides opportunities to source food through small-scale fishing, as well as being a potential revenue stream from recreational divers.

Activities may take place landside, floating on water above the wreck, diving on the wreck itself, or in other places, such as naval chapels, war memorials and military shrines, located far from the site itself. Those with little or no connection to HMAS *Perth* have opportunities to engage through intentional or serendipitous encounters with symbolic objects in Australian, Indonesian and American museums. The diversity of these engagement activities is indicative of the different meanings and values ascribed to the wreck, as well as the potential for ongoing meaning-making in institutional and other non-site specific settings.
However, industrial-scale salvaging has significantly reduced opportunities for many of these stakeholders to engage with HMAS Perth and other naval wrecks in Indonesian waters. Although the methods have changed, the salvaging overseen by Soehardi in the 1960s and 1970s was the start of a pattern that continues today, and is likely to recur. The ability of stakeholders to prevent these covert and sophisticated operations is limited – although they remain the property of the flag State, access to wrecks located in the maritime jurisdiction of another State is complicated by the need for effective mutual cooperation.

The imperative rests on both flag and coastal States, as well as the broader international community, to develop strategies to work together. There are already indications of Indonesia’s preparedness to extend the
‘cultural diplomacy’ model established by the Australian National Maritime Museum and Arkenas to other wrecks in Indonesia. Other suggestions include the provision of technical assistance and training – in legislation, monitoring and enforcement, or maritime archaeology – by concerned flag States, or an expansion of awareness-raising activities in local communities. Consideration could also be given to the active recruitment of these communities in monitoring the wrecks, with an emphasis on the cultural, environmental and financial benefits of the sites.

**Conclusion**
With rumours in the sector suggesting the loss of more than 60 metres of the ship’s stern, and everything above deck one, many observers consider it too late to protect HMAS Perth. However, there are many other notable naval wrecks – not only in Indonesia but worldwide – that require increasingly urgent attention. These wartime wrecks are being accidentally or intentionally damaged by neglect, natural degradation, coastal development, commercial fishing trawlers, and looting. Consequences of this damage include the loss of historical and archaeological material, the desecration of underwater war graves, and environmental impacts such as oil spills and the exposure of still-live munitions.

There is, therefore, an urgent need for stakeholders to re-consider what is understood by protection and preservation, and to begin a process of re-negotiating their claims based on this understanding. Is non-disturbance an essential component of what is meant by protection and preservation? Or is there a way of thinking about protection beyond the ‘do not disturb’ model?

Laurajane Smith has proposed that heritage is not an object or a site *per se*, but a *process.* Scholars such as Cornelius Holtorf have developed
this idea to argue that loss – such as that experienced by HMAS *Perth* – can and should be understood as a part of this process. Our aversion to loss is based on what Holtorf has called the ‘conservation paradigm’, a historically and culturally situated perspective that motivates us to protect and preserve physical reminders of the past.\(^7\) However, Holtorf argues that loss and destruction are not necessarily threats to heritage; in fact, they may *make* heritage.\(^7\) For the families of the sailors still entombed in the little that is left of HMAS *Perth*, this is a challenging, if not unacceptable, argument. I consider these concerns – particularly an aversion to anything that threatens the inviolability of underwater tombs – to be wholly legitimate, and do not dismiss them. Nor do I accept that loss is necessarily unavoidable: Burchell’s interventions alone have ensured that HMAS *Perth* can never be lost in her entirety. Although his actions could be framed negatively for having compromised the archaeological and historical integrity of the wreck, they also resulted in the ‘safe custody’\(^7\) of numerous objects in national museums and other institutions. Meanwhile, the illicitly salvaged bells were recovered and returned to Australia due to the pragmatic approach of stakeholders in Jakarta, Canberra and Perth. Had they been left undisturbed on the wreck, many of these objects would have been damaged or destroyed by the recent salvaging.

Perhaps, therefore, there is another way of thinking about loss as it pertains to threatened naval heritage – one that is not predicated on non-disturbance, but nor does it accept complete loss (on an indiscriminate and industrial-scale) either. Instead, a new approach could prioritise the judicious, informed and early salvage of key cultural heritage objects from vulnerable wartime wrecks, with a view to their long-term preservation, interpretation and display in recognised safekeeping institutions. This
approach could be employed alongside, not separate from, the cooperation strategies outlined earlier.

In making this suggestion, I have drawn inspiration from the actions of the British Admiralty, which, in 2002, acted on growing concerns about the illicit salvaging of its wartime wrecks in Malaysian waters. A team of Royal Navy divers was therefore authorised to remove the bell of the threatened *HMS Prince of Wales*, which is now on display at the Merseyside Maritime Museum in Liverpool. I also refer to the 1995 salvage of the bell from the *Edmund Fitzgerald*, a coal loader wrecked on the Great Lakes in 1975 with the loss of all onboard. At the request of descendants, the original bell was recovered and placed in a public institution as the centrepiece of a memorial; meanwhile, a replica bell, engraved with the names of all who perished, was placed on the wreck as a permanent grave marker.

Rather than simply relying on the re-appearance of ‘touchstone’ objects, such as ship’s bells, on the open market, a well-developed salvage strategy could mitigate the complete loss of wrecks such as HMAS *Perth*. This approach has the potential to provide opportunities for stakeholders to re-negotiate their claims to this and other wartime wrecks, and to re-frame what it is we mean by loss as part of the process of heritage.

**Acknowledgements**

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**Endnotes**

1 Henceforth “HMAS Perth”

2 There is evidence of both spontaneous and systematic unauthorised disturbance of USS Houston, but not the scope to explore this in further detail here. See: Sam LaGrone, "Reports of Illegal Salvage Prompted


4 The Office of Australian War Graves has not afforded HMAS Perth formal recognition as a war grave. However, the Australian National Maritime Museum is working with Indonesian counterparts to have the site listed under Indonesian heritage legislation. Shirani Aththas, "Australian and Indonesian Maritime Archaeologists Survey Wwii Wreck of Hmas Perth (I)," news release, 6 June, 2017, http://www.anmm.gov.au/About-Us/Media/2017-media-releases/HMAS-Perth. Until then, human remains on underwater sites are protected by maritime traditions that preclude the disturbance of underwater graves, both military and civilian. As a military vessel, the wreck also has 'sovereign immunity'. Thus it remains the property of the flag State (Australia), despite being in Indonesian waters. However, sovereign immunity does not ensure protection, not least of all due to the complications of access and monitoring.


9 Aththas, "Australian and Indonesian Maritime Archaeologists Survey WWII Wreck of Hmas Perth (I)."

Two Dutch ships, HNLMS De Ruyter and HNLMS Java, have completely vanished, and, as of November 2016, a large piece was also missing from HNLMS Kortenaer. "Mystery as Wrecks of Three Dutch WWII Ships Vanish from Java Seabed," The Guardian (Australia edition), 16 November 2016. British ships HMS Exeter and HMS Encounter have been almost totally removed. HMS Electra has also been partially scavenged. An American submarine, USS Perch, has also been completely removed (this wreck is not a tomb, the entire crew having been captured by the Japanese). Oliver Holmes and Luke Harding, "British Second World War Shipwrecks in Java Sea Destroyed by Illegal Scavenging," ibid., 17 November.


Ibid.

Ibid.


Some were wrecked a second time in September 1944 when the Japanese cargo transport they were on came under fire from American forces, unaware there were Allied prisoners on board. 'Left to die by the Japanese, prisoners clung desperately to wooden rafts. US submarines [...] rescued 159 oil-sodden, exhausted, starved and dehydrated Allied POWs, sharing their food, clothes and bunks with them. Ibid., 4.


"Underwater Cultural Heritage Inscribed on Unesco’s World Heritage Tentative List," United Nations Educational, Scientific and Cultural Organization (UNESCO),


26 Burchell, The Bells of Sunda Strait, 64-65.


28 Burchell, The Bells of Sunda Strait, 97.


30 The Bells of Sunda Strait, 81.

31 The one-legged Burchell, also an accomplished skin diver, had a support crew on water but did not dive with a buddy.

32 Burchell, The Bells of Sunda Strait, 84-85.

33 Ibid., 116-17.


35 Ibid., 89.

36 "Letter to Director, Australian War Memorial," (1967).


38 These included the binnacle from the bridge, a 20-inch search light, a brass seat from the compass platform, a gyro-repeater from the Wheelhouse, a porthole from the vicinity of the quarterdeck, a voice tube, and several smaller items. Burchell, "Letter to Director, Australian War Memorial."

39 After Perth City Hall was gifted a shell case, requests for mementoes of the ship came in thick and fast. The requests were all worthy and I had
a difficult time deciding who should receive the limited number of items that were available.’ The Bells of Sunda Strait, 131. Some objects were gifted to the various ex-Perth Associations, and to various other individuals and Naval-related associations. HMAS Perth (II) received a voice tube mouthpiece, while Mrs Waller, widow of the ship’s Captain, was given the lampholder from the binnacle, used to light the compass at night. ‘Now every year, on Christmas Eve, she places a lighted candle in it, the burning flame being a silent tribute to the memory of her husband, his ship, and his men.’ ibid., 132. It is worth observing that these objects were the property of the Australian Government, and that these decisions were not Burchell’s to make.

40 Burchell believed the bell to be housed in the Quartermaster’s lobby. The ship was lying on her port side, and finding the door that lead inside the ship was difficult. When Burchell eventually found the right door, he found it impossible to open. Ibid., 89-90. See also: "The Man Who Found the Perth," The Sun, 27 June 1967.

41 "The Man Who Found the Perth."

42 The ship, a modified Leander Class Cruiser, had originally been commissioned into Britain’s Royal Navy as HMS Amphion, before being transferred to Australian in 1939 as HMAS Perth. Perryman, "Hmas Perth (I)."

43 Brian Francis, "War Ship’s Bell on Way Home, Thanks to Adelaide Skin Diver," Sunday Mail, Date unknown: probably September or October 1974. This report also notes that there was interest in purchasing the bell from ‘two Japanese millionaires’.


45 Francis, "War Ship’s Bell on Way Home, Thanks to Adelaide Skin Diver."

46 Peter Burness, "Memo from Curator Relics to the Director Awm, Regarding Correspondence Hmas Perth’s Bell, 4 February," ed. Australian War Memorial (Canberra 1976).

47 Under a concept known as ‘sovereign immunity’, warships, and objects from these ships, remain the property of the flag State unless surrendered or otherwise relinquished. In the case of HMAS Perth, it remains the property of the Australian Government, via the RAN, even though it is in Indonesian waters.

As with many warships, USS Houston had more than one bell. My research indicates that only one of these bells went down with the ship in 1942 – this was the one salvaged by Soehardi in 1973 and presented to the US Ambassador. The second bell appears to have been landed (removed from the ship) prior to the Battle of the Java Sea and ‘ordered scrapped’ – see: Jack MacGuire, "Correcting the Historians." Grand Prairie Daily News, 4 February 1974. I believe this second bell may have actually been removed for safekeeping, as was common in WWII, rather than for scrapping. Either way, the second bell somehow came to be in the possession of the Philippines Government. On 26 October 1966, it was presented to American President Lyndon Johnson by his Filipino counterpart, Ferdinand Marcos. Ibid.


The Canberra-based conservator, Judy Varley, was ‘formerly employed as a conservation assistant at the West [sic] Australian Museum’ and ‘has been primarily engaged in work on metals from the sea.’ Peter Burness, "Memo to the Director, Awm, 17 March 1975, Re. Ship's Bell - Hmas Perth," (Australian War Memorial, 1975).


‘While it is not a proclaimed war grave, the [RAN] still maintains ownership over the wreck.’ ibid.

According to Gavin Fry, the AWM's then-Acting Assistant Director of Programmes and Collections, ‘The most important issue to address, it is suggested, is whether the man who acquired it sought permission from the Department of Defence to dive on the wreck. The HMAS Perth is not a proclaimed war grave, but it is understood, however, to still be the property of the Australian Government. In these circumstances a diver would be required to seek permission to dive on the wreck and should he remove items without seeking approval the matter could perhaps be treated as theft.’ "Note for File, 1 February 1985: Hmas Perth Bell," ed. Australian War Memorial (1985).
"Letter to Director Australian War Memorial, Regarding Bell from Hmas Perth, 30 January 1985."

Letter from Mick Michael to City of Perth, dated 2 February 2012. Quoted by Offen.

Documentation provided by Heritage Perth indicates that the City of Perth acquired the bell in 1984 for $100,000. Ibid. I note that this is a significant increase on the price of $10,000 quoted to the RAN in January 1985. Fry, "Letter to Director Australian War Memorial, Regarding Bell from Hmas Perth, 30 January 1985." My informed assessment is that the bell was in fact acquired in 1985; however, I have been unable to determine whether the price paid was $10,000 or $100,000. Either the seller was able to successfully leverage the City of Perth’s strong interest in acquiring the bell, or one of either the RAN, the AWM or the City of Perth has made an error with their documentation. I also note that City of Perth’s stated purchase date of 1984 does not correspond with the RAN and AWM documentation, which indicates that the bell was still on the market in January and February 1985. Again, I attribute this to data entry errors.

Carpenter, "Hmas Perth I Ceremonial Bell Conservation Treatment."

Offen.

These plates were subsequently acquired by the RAN’s Naval Heritage Collection in August 2012. David Michael, 16 August 2012; 2 September 2012.

McCarthy, "Hmas Perth Plates: Briefing for A. Viduka, 14/08/12."

Some photos depict the Australian White Ensign, accompanied by a floral wreath. See, for example, photos taken in February 2002 by diver Clive Carlin, at: Bruce Constable, "Perth One: Photos of the Perth and Houston Wrecks Today," http://www.perthone.com/pwre.html. However, the Australian White Ensign was only introduced in 1967. Some divers have therefore elected to fly the British White Ensign instead, as that is what HMAS Perth was flying when she sank in 1942. Andrew Fock, 13 July 2017.

tjm1356, "Hmas Perth Dive: Diving the Perth Wreck in the Sunda Straits Java Indonesia October 2010," (YouTube 2010). At [1 minute, 42 seconds] a diver is shown with a memorial plaque to a deceased HMAS Perth sailor.

When I dived Perth back in 1993, we kept it quiet because of that concern and because wrecks like Perth or Repulse and POW [Prince of
Wales] were then off limits. They now feature as regular dive trips; if they're war graves, then they should be off limits. Indonesia's a poor country and having spent 15 years living in Asia, I've seen many examples of foreigners pillaging historical Asian wrecks, as well as souvenirs from the Perth and other Allied war grave sites like K17. We shouldn't be too self-righteous about this.' Tim Gooner, "Comment on Youtube Video, 'Hmas Perth Wreckpedition January 2012'," https://www.youtube.com/watch?v=fO6Ag75OSe4&lc=z130fxmlaoiqzvxhc04cfzzrtrmxfqbkh0.1490529617698870.

68 McKinnon, "Memorialization, Graffiti and Artifact Movement: A Case Study of Cultural Impacts on Wwii Underwater Cultural Heritage in the Commonwealth of the Northern Mariana Islands."

69 Ibid., 2.

70 None of these categories are definitive and the boundaries between them are fluid.

71 Aththas, "Australian and Indonesian Maritime Archaeologists Survey Wwii Wreck of Hmas Perth (I)."

72 Shaw, "Guardians of Sunda Strait: Remembering Hmas Perth and Uss Houston."


75 Laurajane Smith, Uses of Heritage (London: Routledge, 2006).


77 "Averting Loss Aversion in Cultural Heritage."

78 Perryman, "Hmas Perth (I)".


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Biography

Natali Pearson is a PhD candidate in the Museum and Heritage Studies program at the University of Sydney. Her research examines underwater cultural heritage in Indonesia. She is co-founder of Perspectives on the Past, a research group focused on Southeast Asian pasts (www.SEAsiaPasts.com).

Natali holds a Master of Museum Studies (2013, USyd); a Master of Arts in Strategy and Policy (2006, UNSW); and a Bachelor of Arts (Asian Studies) with Honours Class One in History and Indonesian Studies (2002, UNSW). Natali has worked at the Australian Department of Defence, and at the Asia Society’s galleries in New York and Hong Kong. She is an alumni of the Australian Consortium for In-Country Indonesian Studies and the Asialink Leaders Program, and a Term Member of The Explorers Club.
Luso Asian Crewman in World War One

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Abstract
The First World War was a war of empires that took place on land as well as at sea. National identities are based on many of the land battles and especially those sea battles in the Atlantic Ocean and Mediterranean Sea. However the Indian and Pacific Oceans were also places of action, where the physical, political and cultural relics of previous dominant empires continued to play a maritime role. This paper is focused on the Luso-Asians, a disparate group of people from former Portuguese colonies in Asia who served under foreign flags and on foreign ships often before Portugal actually entered the war in March 1916. This research is new, having been compiled in the last three years from multidisciplinary sources around the Pacific and in the United Kingdom. It provides an insight into the continuation and adaptation of maritime cultures to cope with changing imperial fortunes and labour demands and focuses on the emerging evidence from the Great War.

Key words: World War 1, Portugal, Luso-Asians, national identity

Introduction
In the early sixteenth century first a string of Asian ports succumbed to the Portuguese. Few Portuguese women came out to Asia in the early years and the men that survived the journey were encouraged to marry local women, additionally many took on local concubines and had children from enslaved Asians and Africans. Evangelisation resulted in a large Catholic population bearing Portuguese names. These two components of the Portuguese Asia, converts and mixed-race people often intermarried and produced the Luso-Asians. Portuguese or a creole variety of it quickly
became a language of trade and diplomacy throughout Maritime Asia from Hormuz to Nagasaki.

Given the vast area and different local peoples, Luso-Asians became distinguished by place of origin, such as Damanese, Bombay Portuguese, Goans, Malacca Portuguese, Timorese or Macanese. In Dutch Ceylon (Sri Lanka) they were called Portuguese Burghers and in Batavia (Jakarta) they were the Malay-Portuguese. In all cases there are vernacular names for these peoples. There was considerable movement and mixing within “Pax Lusitano” – a process considered as the first dispersal.

Luso-Asian employment by the English stretches back to the first East India Company (EIC) fleet to India in the early seventeenth century (Fisher, 2007). The EIC decided to establish a military navy in 1612 to protect its economic trade and this was the origin of the Royal Indian Navy. The handing over of Bombay to the English in 1661 resulted in the Luso-Asians of Bombay coming under the East Indian Company who loaned the islands from the English crown. As a result they came to be known as East Indians – a name used by them to this day.

By the eighteenth century the Portuguese Asian Empire had been reduced to fragments – Goa (with Damman and Diu), Macau and East Timor. In Dutch, French and English possessions, the Luso-Asians became the founders of the Eurasian or “Anglo-Indian” communities. From the mid-1700s a movement arguably described by John Byrne (2011) as “The First Dispersal” of Luso-Asians begins as they migrate into the British Empire. In fact this was a second dispersal.

Goans form the overwhelming majority of Luso-Asian crewmen in the First World War and for space this paper concentrates on their narrative
through two strands of investigation; firstly there is a genealogical study on the life of one Goan crewman in the Royal Navy (RN). Secondly, there an archival research on the role of Luso-Asians on requisitioned Canadian vessels in the Great War gathered from a variety of sources. Both strands combine to produce a concluding narrative of one Luso-Asian community in the Great War.

**Research**

**The Story of Deogo Antonio Pereira**

Family history among the Goan community resulted in a biography of one Goan who served in the Great War. Deogo Pereira (born 3rd July 1876), and was literate in English and Portuguese. He came from the village of Tivim in North Goa, though he was signed-on in Bombay. After the birth of his second child in 1910 he found work in the Persian Gulf on the HMS *Alert*. This is confirmed by a census return for 1911 that finds him as an Officers Cook in the *Alert* near Kish Island, the census also confirms that there are five other Goans on the training ship, one of which is also an Officers Cook, the other three are Officers Stewards. In 1911 Deogo was discharged (due to a family crisis) but returned to the RN in 1912 on the HMS *Forte* as Officers Cook 1st Class. He then transferred to HMS *Astraea* (Pereira, 2000).

At the beginning of hostilities in Europe on the 28 July 1914, the *Astraea* and the German cruiser SMS *Konigsberg* were at Zanzibar Harbour on the East African coast. Up to this point the war was limited to the Balkans, but on the 31st July 1914, amid a monsoon squall the *Konigsberg* cleared Zanzibar harbour in pursuit by the slower *Astraea*, HMS *Hyacinth* and HMS *Pegasus*. On the 8th August the *Astraea* bombarded the German wireless station at Dar-es-Salaam, making this the first naval engagement
by the allies in the war. The Astraea then sailed off to attack the Germans at Duala in German West Africa (Kamerun). Meanwhile the Konigsberg was attacking Allied shipping in the Indian Ocean and returned to Zanzibar to launch an attack on the Pegasus and another ship on 19\textsuperscript{th} September 1914. Both ships were sunk, but the guns of the Pegasus were salvaged (Patience, 2001).

The HMS Astraea returned to the Indian Ocean and Pereira was on board her when was she was involved in the scuttling of the SMS Konigsberg in the Rufiji Delta July 1915. She then supported the introduction of Indian troops to fight the Germans in Tanganyika. By this time Deogo Pereira had transferred to the HMS Hyacinth. Pereira was discharged in Jul 1916, but returned to duty October 1918 on the HMS Challenger a month before the end of the war. He finally left the RN in August 1920 (Pereira, 2000).

**The “Empress” Lines**

A combination of Naval Staff Monographs, newspaper accounts, medal rolls, archive images and ships logs have been used to piece together a largely forgotten “corner” of the Great War.

Five years before the war in 1909 the British urged the Australians and New Zealanders to establish their own navies, which would combine with the existing RN East Indies and China Stations to form a Pacific Fleet. Of course India already had the Royal Indian Marine. Hence The Royal Australian Navy was formed in 1911. New Zealand agreed to fund her own destroyer under the command of the RN (the HMS Philomel). Canada “simply procrastinated” (Stevens, 2014) and this was to have consequences for Luso-Asians as will become evident. Reluctantly the Naval Service of Canada was proclaimed on 4\textsuperscript{th} May 1910 (Boileau 2010).
A confidential letter from the “Government of India” dated 29th July 1913 and issued at Bombay Castle itemised the two classes of armed merchant ships as “Armed Merchant Cruiser” for conversion to a man-of-war, and Merchant Steamer armed for self defence only in the event of a war. The Admiralty were to reinforce the China squadron with the two “Empress liners” and one from the P&O – the SS Himalaya (Man & Lun). As a result the Canadian Pacific Steamship Company (CPSC) vessels were became Canada’s contribution to the war effort. In the end instead of the two CPSC vessels originally requested, there four CPSC ships were requisitioned, but for the sake of this paper we will only be concerned with two of them, the Empress of Asia and the Empress the Japan, (or simply the Asia and Japan).

The HMCS had just 379 officers and men in total at the start of the war (Boileau, 2010), only just over the number required to crew one of the “Empress” ships. According to naval dispatches the manning of the merchant cruisers presented more difficulty then naval vessels. As a result all of the mercantile crew including the Chinese “signed on” for war service.

The Asia was at Hong Kong when war broke out in Europe and was requisitioned by the admiralty immediately on the 3rd August 1914 before hostilities began as “an armed merchant cruiser” and troop carrier. She was painted light grey and armed as noted in the Vancouver Daily Province newspaper. The Asia sailed with a compliment that included most of her regular officers, engineers and Chinese seamen. Her first task was to sail north where she joined the battleship HMS Triumph that was watching the German port of Tsingtau. On the 12th August the Empress of Japan arrived at Hong Kong and was also armed as a merchant cruiser.
Initially, following Japan’s entrance to the war on 23rd August, the two Empress vessels were assigned to petrol the trade route from Hong Kong to Singapore. Then the two vessels were assigned to blockade German vessels at neutral Manila and look for the German light cruiser SMS Emden (Turner, 1981). They were then assigned to protect Colombo and the troop convoys, when two of the Chinese crew on the Asia died in October. In fact it was the Asia that ferried the German injured to Colombo after the HMAS Sydney’s attack on the Emden in the Cocos Island.

The war suddenly widened when the British sloop HMS Odin was in the Shatt Al-Arab (Southern Iraq) on the 1st November 1914 and was informed that war had been declared on Turkey. The Captain recorded in the ships log that he heard gunfire on the river at 4:30am. The ship remained in the waterway and at 12:45pm she transferred her “Goanese Servants” and Somali crew to the SS Oporto. Britain retaliated on the 2nd November with an attack on Aqaba in the Red Sea. On the 4th Turkey officially declared war on the allies.

All troops and supplies from India, Australia, New Zealand and Southern Africa needed access through the Red Sea to Egypt and the Mediterranean. In the middle of the 20 mile Bab Al-Mandeb strait is Perim Island the main coaling port between Egypt and India and obviously a strategic location. The two Empress vessels were reassigned this time to Aden. The Asia arrived first, with some Goan crew, and held naval practices with the HMS Clio off Perim Island on the morning of the 11th December 1914.

The log for the Japan on the 1st February 1915 states that she was dry dock at Colombo. On the next day “26 Chinese [were] sent to jail” and on
the 10th the “Chinese Firemen [were] sent away for passage to Singapore”. The ship cleared the dry dock and took on provisions, coal and ammunition. Then on the 16th February “116 Ratings (Indian) joined the ship” and “70 Chinese ratings [were] discharged to shore. The Japan then headed for the Gulf of Aden. According to Robert Turner (1981), “for the first time, she [the Japan] sailed without her Chinese waiters and stokers, who had been dissatisfied with being away from Hong Kong for so long. Therefore they were sent home and replaced with natives of India”. The log entry does not elaborate on the incident.

Medal Rolls identify the “natives of India” as Muslim crewmen from British India, Luso-Asians from Goa and Ceylon and some crewmen from Northern Somalia. Some Chinese crew remained on board as the log books later mention that the captain “sent [a] sailor (Chinese) to hospital on Perim Island” on the 6th March. For the next two months the primary roles of the Japan was to search dhows for Turkish informants, supply British Royal Navy vessels and lighthouses with provisions, report on other shipping, and deliver mail to Royal Navy vessels. The two Empress vessels were part of a blockade at the strategic entrance to the Red Sea and were sighted by the HMS Northbrook into May. Records show that HMS Northbrook also had Goan crewmen such as Officers Cook L.B. De Souza.

Things were far from quiet at the southern of the Red Sea. On the 8th and 9th of June 1915 the Empress vessels were engaged on an assault with Indian troops on the Turks at Jebel Mahasin. The key point was to secure the Kamaran passage and the telegraph station. Eight prisoners were captured and brought on board the Japan - seven of them Turkish.
The Japan then headed south to Perim Island where the Turks had fired shells from the Arabian mainland onto the British lighthouse. On the 13\textsuperscript{th} June the Japan began returning firing on the Turks and then headed for Perim Island itself which was still being bombarded. The bombardment continued into the next day, and early in the morning of the 15th June under darkness the Turks attempted a landing on the island. The Japan sailed around Perim Island and attacked some dhows, presumably the ones making an attempted landing. Two days later she repulsed another attack while awaiting the HMS Northbrook. This second attack was at the Lloyds Signalling Station on the Western side of the island.

The logs state that the Japan sailed back to Aden on 19\textsuperscript{th} June when a “Goanese Boy” was sent to jail. At the end of June the Japan sailed to Colombo. The Japan then sailed to Alexandra Dock in Bombay and was placed into dry dock where she was repainted and fitted-out with new furniture. The logs confirm that on the 21\textsuperscript{st} August 1915 the remaining “Chinese sailors and Boys left [the] ship for Hong Kong”. The ship itself, with an “Indian crew” did not get to Hong Kong until 23\textsuperscript{rd} September 1915. On October 22\textsuperscript{nd} 1915 the “Indian crew left Hong Kong for Bombay on the SS Malta”. The Asia arrived in Hong Kong on the 6\textsuperscript{th} November 1915. By May 1916, the Japan and Asia were back to their normal Pacific runs (Turner, 1981) with their normal compliment of Hong Kong Chinese and Euro-American crew.

**Conclusion**

Over 150 Goans had been granted medals by the Royal Navy (RN) in the war. So far only one Eurasian crewman from Singapore has been recorded. The precise number of Luso-Asians who served on the Royal
Navy is not known at the moment. Goans were frequently transferred during the war. For example the nine men on the HMS Alert in 1914, all ended up serving on nine different vessels.

The evidence here suggests that the majority of Luso-Asians involved in actions the First World War were from the Portuguese colony of Goa and the majority were in the Merchant and Royal Navies, especially those of Britain, Canada and British-India. The question is why and how this came to be?

In 1910 the demographically largest of the Portuguese Asian possessions was Goa (with Daman and Diu) with approximately 475,000 people of which just over 54% of the population could be described as Luso-Asian (Srivastava, 1990). However, in the same year some 47,334 left Goa, mainly to British India (Byrne, 2011). That is almost 10% of the population had migrated, and Luso-Asian were the predominant group. Evidence suggests that this trend had been in place for decades. Goans appear on RN and British merchant vessels from the 1871 census onwards. They were part of the RN crew HMS Euraylus and HMS London during the British Antislavery Campaign in East Africa, and appear as cooks on immigrant ships to Australia such as the Parramatta. The 1901 UK census identifies Goans on RN vessels on East Indies fleet including 31 on the troopship HMS Assaye during the Boer War. Between 1909 and 1914 around 158 Goans had served on fifteen RN vessels as part of a British anti-piracy and gun-running campaign in the Persian Gulf.

Goan men went to British India through the kudd (or coor) system. Each kudd (a mixture of hostel and employment agency) was connected to a particular village in Goa and run by Goans. The Bombay Presidency of the British Raj held huge eco-political sway over the Western Indian
Ocean and the *Kudds* of Bombay offered a system to employment and migration for a community that was Christian, had no food or drink restrictions, was increasingly literate in the Latin script and conversant to some degree in either Portuguese or English or both. These *kudds* would be visited by agents from shipping companies, the RN or the Bombay Marine (Pereira, 2011). This indigenous system of labour migration had evolved over a century to the benefit of both the Portuguese and the British.

Many Goan crewmen had already served merchant ships before signing-up for the RN where they were expected to undergo training as attested by the Deogo Pereira and the Goans on board the HMS *Alert*. These men were enrolled on the “Principle Conditions of Non-Continuous Service”. Goans who were destined to be stewards and cooks were often initially engaged as “boys” and had to be “trained at depot ships before serving commissions afloat” under the enrolment terms. They also had to “agree to serve for five years from the date of entry”, though this could allow for a break and would often involve a change of vessels. Most Goans in the RN had actually signed on well before the start of hostilities. It also appears that some Goan crew, as in the case of the HMS *Odin*, were offered the option of discontinuing their service in the event of war. In fact prior to the war in early 1914 records show that 158 Goans on RN vessels received the Persian Gulf clasp. A Most of these appear to have stayed in the RN though transferred frequently onto other vessels as the career of Deogo Pereira demonstrates. They were also augmented by other Goan crewmen.

The Goans employed in the Merchant Navy the RN and by the Admiralty on the two acquisitioned *Empress* vessels were placed within an
established British ethno-occupational system. The Goans were placed at an interface between the crew and passengers. The Chief cooks of both the Asia and the Japan were Goans and they were everywhere occupationally tied to the daily needs of their European crew and passengers. Goans were also bandsmen and one group received their General Service medals in early 1915 at Port Said in Egypt on board the HMS Swiftsure. This battleship was the flagship of the East Indies station, and employed more Goans than any other British vessel. Originally the ship escorted ANZAC and Indian troop convoys to Aden. After defending the Suez Canal from Turkish attack in 1915 the HMS Swiftsure went on to the famous Gallipoli Campaign. The granting of medals in 1915 at Port Said marked the transfer of the ship to the Atlantic Fleet¹. The Goans were transferred at Port Said onto other vessels for return to the Indian Ocean. Their role would be taken by Maltese crewmen.

The number of Goans serving on the Royal Indian Navy is not known at the moment. Detailed research has identified 117 Luso-Asians on the two acquisitioned and Empress vessels who were awarded medals by the British Admiralty.

In fact during the war ships of the BISNC and the P&O made up 90% of the British convoys. Most of their stewards and cooks were Goan (Haws, 1988). On the 16th October 1914 a convoy of forty-five ships left Bombay harbour, including fourteen troop transports carrying 8000 Indian troops for Mombasa. Many of these ships such as the P&O ship SS Karmala had Goan crewmen (Farwell 1987). Five of the P&O ships manned by their Goan Volunteers led the fatal landings (Cable 1937) at the Battle of Tanga. German raiders attacked shipping and laid mines across the globe...
and many Goans were among the casualties. One event remained in the Goan memory for decades. The P&O liner S.S. *Persia* was en-route to India, with several high profile passengers, including the American Consul to Aden, when she was hit on the 30th December by a German torpedo off Crete, resulting in the death of 343 of the 519 passengers and crew board. Records suggest that 67 Goan crewmen died on that night, a huge blow to a small territory like Goa, especially as many would have been from the same village. The action broke international naval law and Imperial German codes, as there was no warning or attempt to assist the survivors. One of the lucky survivors was L Fernandes, a former Officers Steward on the HMS *Dartmouth*, he lost his Persian Gulf Clasp that had just been granted to him on the HMS *Hyacinth* on the 17th December 1915. When he returned to the Royal Navy it was reissued on the 9th February 1916.

To date 95 Luso-Asian fatalities on British Merchant vessels have been recorded, though the number seems suspiciously low.

The Goan involvement in the war could be regarded as Portuguese action, even though it occurred prior to March 1916 when Portugal joined the Entente Powers (O’Neil, 1919). In fact Portugal had the right by the Germano-Portuguese Treaty of 1908 to take sovereignty over her ports after Germany invaded Mozambique and Angola. The delay in joining the allies in the Great War was perceived by many Luso-Asians as further inability of Portugal to safeguard her interests as well as those of her colonies and their peoples. Generally the Portuguese appear to have no idea of the significance of the Great War to its colonies and their inhabitants (Bragança-Cunha, 1937), which is still the case today.
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Biography:

Cliff Pereira is a senior researcher specialised in bringing the strands of history and geography, community, heritage and academia together to create factual, colourful, strong, interwoven social narratives with equity and cultural sensitivity leading to personal and community empowerment with an emphasis on shared cultural spaces. He has broad experience consulting for development in the heritage sector, especially for small, medium-sized and large museums, sensitive narratives, diversity and inclusion and accessibility.
The President Coolidge: a Report by the Vanuatu Cultural Centre

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Abstract

The SS President Coolidge is one of two luxury cruise liners valued at $7,050,000 and was built by the Dollar Steamships Company located in Virginia USA in the 1930s. Christened by Mrs. Grace Goodhue Coolidge, the ship was designed for speed and luxury on the seas. During the Second World War, the Coolidge was used as a carrier to transport US troops to the war in the Pacific but unfortunately, on the 6th of October 1942, in its maiden voyage as a carrier, it struck a mine that was put up by their own forces as a blockade to impending Japanese attacks. It sank just off the reef in the eastern part of the Segon Canal with its captain.

The President Coolidge is currently on the Tentative List for Vanuatu’s World Heritage site, but due to lack of experts in this field, not much work has been done on the wreck since its placement on the Tentative List. In 2015 the US Navy went to salvage remains and belongings of the soldiers who went down with the ship. The President Coolidge has, for some time now, been used as diving site with many keen tourists visiting it to see this great luxury liner. The tour operators in the area have tried to keep the ship as it was over the years and the Vanuatu Cultural Centre needs to work more closely with them and the to ensure the ship’s better protection.

Key words: Vanuatu; recreational diving; SS President Coolidge; World War II; world heritage
Introduction
Underwater Archaeology in Vanuatu is a relatively new concept to Vanuatu archaeology. Although archaeology in Vanuatu has been ongoing since the mid-1900s, most indigenous Ni-Vanuatu were not aware of its significance and how it contributes greatly to understanding Vanuatu’s diverse cultural heritage. It has only gained momentum with the discovery of the famous Teouma Lapita site in 2003 and the amount of information derived from the eight years of excavation on the site. Underwater archaeological sites are pretty much well preserved as access to such sites has only been accessible recently with modern technology thus the traces of human existence from sunken ships to entire cities, such as the Pharos of Alexandria buried by the Mediterranean sea (Guerin et al), have remained relatively untouched by human activity since their submergence. Neanderthalian hunting grounds, painted caves and Maya sacrificial sites and ancient pile dwellings have also been found swallowed by the sea.
The SS President Coolidge with its dual function as a luxury liner and later as a marine vessel until it sunk in 1942 in the Segon Canal on Santo Island is one of the largest accessible wrecks in the world (The times 2007).

Background
Beginning
The SS President Coolidge is one of two luxury liners that were built by Dollar Steamships Company during the depression in the 1930s to meet the company’s increasing expenses and turn in modest profits. The company was losing a lot of money because of the depression and had to reduce their fare prices, therefore the fleet was making less than it was spending.
In 1938 the Dollar Steamships Company with its huge outstanding debts was forced to surrender the company and its assets to the government including the SS President Coolidge over to the US Maritime Commission. The once luxurious cruise liner was eventually stripped of its colorful decorations and draped in navy grey colors of the marine and used as a transport ship. Transporting soldiers to the battlefront and naval bases around the Pacific which continued until it met its fate when it struck two underwater mines on 26\textsuperscript{th} October 1942 in the Segon Canal on Espiritu Santo, Vanuatu.

**Wreckage**
Considered as one of the top ten wreck diving sites in the world (the times 2007), the SS President Coolidge rests on the sea floor of the Segon Canal; resting on its port side about 21 metres (69ft) and her stern at 73 metres (240ft).

![Fig. 1: Drawing of the President Coolidge of how she lies in the sea.](image)

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It is considered as one of the largest accessible wrecks in the world with its many rooms that are accessible. The SS President Coolidge is one of Vanuatu’s community income asset similar to Vanuatu’s World Heritage site; the Roimata domain. Because of its cultural heritage significance not only to Vanuatu but also to the Pacific and the world, the Coolidge is one of the most visited wrecks in the world.

**Lady in Waiting**

One of the main attractions of the wreck is the “Lady In Waiting”, an Elizabethan statue that sits above the fireplace 45m into the ship. She was recently removed, cleaned and put back in her original position. This is an example of preserving its integrity as nothing has changed except that it was cleaned to make it stand out more and it also makes it more attractive to visitors.

![Fig. 2: Picture of The Lady.](image.png)

With its dual function as a luxury cruise liner and then a military vessel, the President Coolidge boasts a unique combination of features which has made it one of the top ten diving wreckages in the world (The Times, 2007).
Archaeology
Salvage
Salvage excavations began as early as 1942 which saw the USS Ortolan coming to salvage the war supplies and materials from the wrecked ship and took ten days to remove the items.

Remains
The remains include propeller blades, bunker oil, brass casings of shells, electric motor junction boxes.

Two officers who perished with the ship included Captain Elwood J. Euart who had already managed to escape and upon hearing that there were still soldiers who were trapped went back and began rescuing them from the infirmary until he was so tired that he could not pull himself up the rope and out of the ship to safety, and perished when the ship slid off the reef and into the sea. The other officer was Fireman Robert Reid who died upon impact when they hit the mines as he was in the engine room.

In 2015, a US recovery unit based in Hawaii arrived on Luganville, Santo and removed the remains of the perished soldiers from the sunken ship. This was possible after so many years because the government of the Republic of Vanuatu declared that nothing was to be removed from the ship, until recently when it allowed for the removal of the remains to be given a proper burial.

Shipwrecks are ‘time capsules’ locked away through history and only recently are being accessed with the advancement of technology (Edney 2006). When ships sink they take with them everything and because level of technology during the World Wars, it was quite difficult to access these underwater wrecks. In recent times and modern technology, accessing these wrecks is quite easy and in most cases has been turned to a tourist attraction and a marine reserve such as is the case of the SS President Coolidge.
World Heritage
The site was nominated into the World Heritage Tentative List by the Vanuatu Cultural Centre in 2007. The President Coolidge is been recognized as a significant part of Vanuatu history and is protected by the Laws of Vanuatu; creating a marine conservation area including a buffer zone to protect the wreck and its marine surroundings; ‘Fisheries Act Cap. 158, Gazette No. 40 of 21 November 1983 which states that: The area of waters defined below and the seabed underlying such waters is hereby declared to be a marine reserve.’ (World Heritage Tentative list)

Area of waters
The area off the south coast of Espiritu Santo Island to seaward of the high water mark of spring tides and bounded by a line from the "white rock" in position latitude 15° 31' 16"S, longitude 167° 13' 32"E (on British Admiralty chart 179) extending 180° true for 0.3 nautical miles, then 090° true for 1 nautical mile and thence 000° true, to the shore. This area includes the wreck of the President Coolidge and the area known as Million Dollar Point.’ (World Heritage Tentative list)
Currently the wreck is frequented by dive operators, and over the years they have set up procedures to preserve the site from loss of artifacts and further degradation. Great care is taken to prevent damage. The Vanuatu Cultural Centre has had discussions with the tour operators and indigenous land owners, and all are in agreement that the site should be of World Heritage status. They realize that with such status, there may be some restrictions imposed and issues may arise, but are willing to work together with the Vanuatu Cultural Centre and UNESCO to accomplish this in a manner that will suit all parties involved.
The Vanuatu Cultural Centre plans to work more closely with the dive operators and the indigenous land owners to continue the preservation,
protection and promotion of the wreck of the President Coolidge, and is looking forward to working with UNESCO in achieving a World Heritage status for the site and for the further preservation, protection and promotion of the site.

**Cultural Heritage in Vanuatu**

The UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage acknowledges the importance of protecting underwater heritage from shipwrecks to settlements natural and man-made. The convention recognizes these underwater sites as not only being significant to heritage but also having economic value. Encouraging responsible public access to sites but also provides income activities to local communities, showing that cultural heritage is a very important tool for economic development.

UNESCO also through the convention has established a Law Database at the disposal of state parties to safeguard their underwater cultural heritage. The convention is quite useful for countries like Vanuatu where underwater cultural heritage is a relatively new concept, Vanuatu still does not have a proper legislation in place for effective management and protection sites. Therefore the Vanuatu Cultural Centre uses the Preservation of Sites and Artefacts Act to assist in protecting cultural sites on land and underwater to ensure their protection and integrity.

Oral traditions also have underwater villages and sites which are considered sacred…

Tourism industry is one of the main income generating sectors in the community level in Vanuatu. Underwater heritage sites such as the President Coolidge allows local communities to have an income from visitors to the wreck, therefore by seeing the economic value of such sites
local communities become encouraged to protect and preserve these sites.

**Conclusion**

Vanuatu is home to quite a number of the World War shipwrecks, most of them located around Santo. A number of local shipping vessels can also be located around Vanuatu’s sea bed, being sunk on purpose or shipwrecked, Vanuatu’s ocean floor has a lot to provide on Vanuatu’s Cultural Heritage.

The underwater cultural heritage in Vanuatu does not only refer to the sunken ships, but also to villages and islands which once had people but have now been swallowed by the sea. Some of these are evidenced while others are orally passed down from generation to generation and thus the site becomes revered and respected, protecting and preserving its integrity.

Vanuatu still has a long way to go in order to having the capacity to carry out underwater archaeological researches but with advances in technology and interests of researchers Vanuatu’s underwater heritage will be slowly and uncovered, promoted and preserved gaining significant recognition from the local population similar to sites on land.

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**Biographies**

![Image](image1.png)

Mr. Edson Willie graduated from the University of Papua New Guinea in 2013 with a BA in Archaeology and has been working at the Vanuatu. He started off working for the Archaeology Unit as a Field Officer and is now the resident Archaeologist.

![Image](image2.png)

Mr. Richard Shing did 4 years of study at the University of Papua New Guinea and started working at the Vanuatu Cultural Centre in the year 2000 as the Database and Catalogue Manager. In 2007 he became the Archaeologist and in 2016 as Manager for the Vanuatu National Heritage Register. In 2017 he became Acting Director of the Vanuatu Cultural Centre.
Perspectives on World War II Shipwrecks in Hawai`i and the Pacific

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Abstract

The turbulent war years had a large impact on the landscapes and cultures of the Pacific, and consequently left a large cultural footprint of submerged ships and aircraft and infrastructure across the region. Rather than simply random distributions of individual sites, World War II shipwrecks sometimes reflect the organization of planned conflicts, such as the combined air/sea/land forces amphibious operations, creating a naval near shore landscape of associated sites. Sometimes ships and aircraft lie in deep ocean waters far beyond conventional diving depths. Advancements in technology are beginning to render some of these deep sites more accessible. Live events, broadcasting real-time ROV surveys to collaborating research teams and the general public through the internet, have proven successful in engaging a wide variety of interest groups. What type of information can be gained from these near shore amphibious landscapes and deep ocean visual surveys? And what kind of questions should we be asking of these modern and often prefabricated historic resources? WWII submerged sites remain close in memory, and can also have important consequences for the marine ecosystem. This paper will examine selected World War II sites in Hawai`i and the Pacific and discuss some of these issues in the context of the broader Underwater Cultural Heritage.

Key words: Cultural landscape, World War II, Pacific, Amphibious operations, diving
Introduction and single site investigations:

There are many types of historic vessels in the Pacific and therefore many submerged sites of historic properties in the Pacific region that have the capacity to provide information on early exploration and migration, trade, fishing and whaling, the transition to steam commerce, and more. Shipwreck sites associated with the events of World War II are a particularly evocative subset due to multiple factors, such as the dramatic and often tragic impacts of the war years in the Pacific, the nature of these shipwrecks as war graves, and the power of memory over more recent 20th century events. In some locations such as the Hawaiian Islands, WWII period Underwater Cultural Heritage properties comprise the majority of submerged UCH sites.

Historical surveys of WWII in the Pacific generally emphasize the major capital vessels and the most well known battles, as these events have had a large influence on the outcome of the conflict. Diving investigations generally proceed on a site-by-site basis, simply due to the constraints of working underwater. Research covers the individual ship’s service history and the specifics of the loss event, and compares these in detail to data from the field survey and observations of site’s formation processes. The public report or presentation, likewise, usually features an individual shipwreck or property. The investigation of the USS Arizona provides the best-known example of productive archaeological and site formation process information from the individual ship approach. The National Park Service has led the multi-year effort in understanding the archaeological interpretation of the wreck site, and the metallurgy and deterioration of the vessel (Wilson et al 2007; Russell and Murphy 2004; Johnson et al 2000). The shallow depth and harbor location provide easy access to the wreck.
The site itself offers numerous other lessons in heritage and visitor management and resource protection.

**Deep ocean discoveries:**

The discovery of other WWII wrecks benefits from new capacity for deep ocean remotely operated vehicle technology. The NOAA ship *Okeanos Explorer* features a 30 kHz Kongsberg EM 302 multibeam sonar and a dual-body ROV system capable of diving to 6,000 meters, making the vessel an excellent platform for the investigation of deep large shipwrecks. The mission of NOAA’s Office of Ocean Exploration and Research (OER) is to explore the world’s largely unknown oceans for the purpose of discovery and advancement of knowledge through innovative explorations, development of advanced undersea technology, undersea research, and outreach/education. This includes OER’s Marine Archaeology Program and the discovery and site characterization of UCH. OER supports the UCH survey standards as enumerated in the Annex Rules of the UNESCO Convention on the Protection of the Underwater Cultural Heritage.

Via high-speed satellite networks and internet-based collaboration tools, the *Okeanos* uses telepresence to engage archaeologists and other scientists on shore in real-time, minute-to-minute, collaborative decision-making during mapping and ROV operations. Simultaneously, tens of thousands of general public viewers can tune in online to watch and listen to the ongoing exploration.

These non-invasive live high-definition video archaeological surveys in the Pacific include: American submarine *S-19* lost in 1938 (survey September 2015); Japanese naval auxiliary *Amakasu Maru No.1* sunk by the USS *Triton* near Wake Island (survey March 2016); American B-29
lost near Tinian Island (survey July 2016); commercial vessel *Royal Taipan* sunk near Oahu (survey December 2016); and the Japanese midget sub sunk near Pearl Harbor (survey December 2016).

![NOAA ROV Deep Discoverer at the wreck site of an American B-29, near Tinian Island. (NOAA OER)](image)

**Fig. 1: NOAA ROV Deep Discoverer at the wreck site of an American B-29, near Tinian Island. (NOAA OER)**

The ability to tap the expertise of specialists on shore in real time, and to share these discoveries with the public, is changing the way that UCH research is conducted and shared (Cantelas et al 2017). In addition, the University of Hawaii’s Undersea Research Laboratory (HURL), with its two **PISCES** three-man research submersibles rated to 2,000 meters depth, has discovered and surveyed dozens of deep ocean WWII wreck sites, including: Japanese submarines *I-400, I-401, I-14, I-201*, Japanese *ko-hyoteki* submarines (2), and a variety of landing ships and aircraft (Van Tilburg and Delgado 2017).
Both the *Deep Discoverer* (*Okeanos* ROV) and HURL’s *PISCES* manned submersibles have the capacity for recovering material samples and small diagnostic artifacts with their manipulators. *PISCES* lacks downward viewports or cameras, so cannot compile plan views of the wreck site. The camera sled above *Okeanos’ Deep Discoverer*, named *Seirios*, does have two high-resolution downward-pointing HD cameras, providing plan view mapping capacity alongside two 2,400-watt very high intensity hydrargyrum medium-arc iodide (HMI) lights. *Deep Discoverer* itself puts out an impressive 96,000 lumens of light for its HD cameras. The ROV system has a depth capacity three times greater than the HURL submersibles (6,000 meters compared to 2,000 meters), but must avoid “shallow” depths less than 500 meters due to heating issues. A lack of accuracy in positioning, a problem that increases with depth, restricts both ROV and manned systems from making accurate site maps of scattered debris on the deep sea floor.

The majority of deep ocean naval UCH in the Hawaiian Islands are not the result of training or combat losses, but intentional disposals including scuttling and target sinking exercises. Though the wrecking event is often more dramatic in the former rather than the latter, this should not necessarily imply any difference in historical or even archaeological value. Assumptions of diminished archaeological significance of intentionally abandoned and disposed watercraft are generally based on the human tendency to anthropomorphize and personify vessels (Richards and Seeb 2015).

Intentional disposal processes reflect patterns in the military landscape. The number and variety of deep military properties south of Oahu have led to the area being nicknamed the “Pearl Harbor midden.” Dedicated surveys to define the boundaries of this area several miles south of the
harbor entrance were conducted in 2008, documenting 155 separate sonar features (Kelley 2008). The midden is a literal cross section of military presence in the islands, possessing everything from floatplanes from the 1920’s to military vehicles to amphibious craft and patrol craft from WWII. Larger amphibious ships and submarines, used as aerial or torpedo targets, were sunk further offshore, approximately 10-15 miles south-southwest of Barber’s Point on O`ahu. Today target exercises are conducted during RIMPAC (Rim of the Pacific Exercise), sinking decommissioned vessels in a zone 55 miles north of the island of Kaua`i (Commander Naval Surface Force 2017).

Less is known of the marine environment and site formation processes for these hard-to-access deep ocean UCH sites, though some estimates have been made of metals deterioration for the Japanese mini-sub near Pearl Harbor (depth 400m+), and comparative studies exist for deep WWII shipwrecks in the Gulf of Mexico (Wilson et al 2007; Church et al 2007; Overfield 2005).

**Opportunities for multidisciplinary survey:**

Accessing the deep ocean is a high-priced technology-dependent activity, so it is incumbent on researchers to maximize data collection. It is now becoming a best management practice for UCH investigations and data analysis to include biological expertise for the assessment of deep ocean reef communities, as well as specialized knowledge in critical issues associated with UCH, such as potential fuel oil pollution or unexploded ordnance (Edwards et all 2016; Church et al 2007; Cox et al 2007; National Oceanic and Atmospheric Administration 2013). UCH surveys which overlap with these issues benefit from a collaborative multidisciplinary approach (Fig 2).
Approaches to massed WWII UCH:

In 2017 NOAA’s Office of National Marine Sanctuaries completed a statewide UCH inventory for the main Hawaiian Islands. Even though the islands were only attacked four times during the war (Pearl Harbor/Oahu December 7th 1941; submarine shelling of Kahului, Nāwiliwili, and Hilo harbors December 30th 1941; seaplane bombing on O`ahu March 3rd 1942; and the Battle of Midway June 4-7th 1942), naval ships and aircraft make up 70% or 1,480 entries of the 2,120 known and predicted submerged UCH sites (Van Tilburg and Delgado 2017). Many of those losses are landing craft and naval aircraft that crashed or ditched in Hawaiian waters while conducting training or normal base operations during the war years.
This individual ship/site approach now conducted by OER (above) for major vessel losses is well suited to capital vessels with extensive documentation. The totality of all period submerged resources or cultural footprint, however, includes the archaeological resources of numerous aircraft, landing craft, support and supply ships of the extensive fleet auxiliary logistical train, lost both in combat and in non-combat operations, such as in transit and in training. Many of these smaller craft are mass-produced and do not have the document trail of larger vessels. Site-by-site analysis is less suited for understanding the large number of much smaller identical mass-produced landing craft and aircraft. What type of archaeological information do these massed-produced types of UCH properties, so critical to the success of amphibious and aviation strategies, have to offer?

The archaeological information in question comes not from individual analysis, but from comprehension of multiple wreck sites within the military cultural landscape. Cultural landscape studies do not represent a new concept, but have long been recognized as useful tools in describing distinct geographical areas of associated cultural and natural features. Dr. Christer Westerdahl first introduced the term “maritime cultural landscape” as an archaeological concept spanning both sea and land, and other scholars since then have further refined the archaeology of maritime landscapes (Westerdahl 1992). The approach has been adopted by U.S. federal agencies engaged in UCH preservation.

“A Cultural Landscape Approach (CLA) offers a means for looking at the important ways in which specific cultural and environmental processes overlap and influence one another. The intellectual concept of cultural landscapes has been established for nearly a century, but its application to the management of marine resources is quite new. Cultural landscapes identify combinations of human activity and natural areas and resources that have left identifiable
Is the landscape approach capable of revealing patterns and information beyond individual site analysis for aircraft and multiple landing craft in the Pacific near shore environment?

Warfare has been called “one of the most organized, premeditated, regimented, and patterned forms of human behavior…the actions of military units on a battlefield are based on the tactics of the prevailing military wisdom of the day; they are not random” (Potter et al 2000). Amphibious tactics evolved quickly in the years prior to WWII. A carefully orchestrated sequence of obstruction clearing, minesweeping, and naval gunfire barrage often preceded the massed deployment of coordinated waves of AMTRACKs and landing craft, prior to the ship-to-shore phase as infantry transports and LST’s offloaded tons of supplies. Specialized tactics had been developed by the U.S. Navy during the 1930s and refined in the early years of WWII. The cultural landscape approach, spanning both sea and land, is particularly well-adapted to the interpretation of amphibious operations.

Intensive amphibious training was conducted in the channels, bays, beaches, shorelines, and skies above Hawai`i during the war years (Fig. 3). Training areas were generally on the leeward (protected) side of islands in areas featuring access to sandy beaches unobstructed by wide coral reefs.
The Wai`anae Amphibious Training Center, largest of the several amphibious schools among the islands, established a replica of the Japanese defenses at Tarawa Island at Mākua Beach. The Waimānalo Amphibious Training Center featured logs, concrete emplacements, and sandbags representing fixed shore defensive positions (Dorrance 1994). Terrain near Waimea provided a close match for conditions at Saipan, Guam, and Palau (Chapman 2016). The Maui Amphibious Training Center was a hub of activity. Exercises centered on the protected waters and leeward beaches along the southern coastline from Mā`alaea Harbor to Mākena Landing (Fig. 4).
Fig. 4: Training map showing deployment areas and approach lanes, Maui’s southern coastline, 1944. (National Archives)

Ships from Pearl Harbor and Kahului converged on Mā`alaea Bay during coordinated training operations prior to major Pacific engagements, such as the invasion of Tarawa in November 1943, Roi-Namur in January 1944, Saipan in June 1944, and Iwo Jima in February 1945 (Chapman 2016). Defensive infrastructure along the shoreline at Wailea replicated the island of Tarawa. Some of the many submerged amphibious vessels in the Hawaiian Islands were lost during these training exercises (Table 1). These training losses occurred near the defined assault lanes at the amphibious centers.
Table 1: World War II period navy amphibious UCH resources in Hawai`i.

<table>
<thead>
<tr>
<th>Total number</th>
<th>Amphibious types (tracked amphibious assault vehicles)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>AMTRACKs</td>
<td>Includes: LVT-1s, LVT-2s, LVT-4s, LVT(A)-1s, LVT(A)-4s</td>
</tr>
<tr>
<td>26</td>
<td>Landing Craft (ramped landing vessels)</td>
<td>Includes: LCTs, LCMs, LCUs, LCIs, LCVPs</td>
</tr>
<tr>
<td>9</td>
<td>Landing ships (amphibious ships and transports)</td>
<td>Includes: LSMs (landing ship medium) and LSTs (landing ship tanks)</td>
</tr>
</tbody>
</table>

Diving access to these shallower sites is relatively easy, so field surveys include accurate plan view site maps produced from baseline trilateration methods. Today signage, monuments, and shoreline infrastructure like machinegun pillboxes mark the traces of these training centers. Records for WWII amphibious operations, including training exercises in Hawaii and combat operations in the South Pacific, can be accessed at the National Archives and Records Administration in College Park, Maryland (NARA II). These records include maps of approach courses, landing craft deployment areas, and narrow assault lanes to the beaches (figure 4).

Many more naval aircraft were lost in Hawai`i during the war years (Fig. 5). Aircraft crash cards for the period 1922-1952 reveal 1,375 ocean losses, 93% of all the naval UCH properties in the islands. Of those naval aircraft losses during three decades, 1,201 (87%) occurred during the war years, statistical testimony to the priority of naval aviation in World War II. Hundreds of young lieutenants and radio operators and engineers were taught the basics in training camps on the continental U.S. and then shipped out to the Hawaiian Islands for intensive combat training experience over unfamiliar waters.
Fig. 5: Naval aircraft losses per year (1922-1952) and UCH aircraft types, for the Hawaiian Islands. Highest training losses (542 aircraft) occurred in 1945. (NOAA ONMS)

Many areas were used for combat training around the islands. Kaho`olawe, became known as one of the most shot-at and bombed island in the world. The Navy also used `Īlio Point on the northern end of Moloka`i, and Mokuho`oniki Rock, off Moloka`i’s eastern end, as target areas (Allen 1950). Other bombing target areas included Kahuku on O`ahu, Makanalua Peninsula on Moloka`i, and `Opaua Point on Maui (Historical Section 14th Naval District 1945). Twenty-five army and navy airfields and stations existed in the main Hawaiian Islands during WWII.

Today the outlines of the runways and left over revetments remain throughout the islands. Yet, despite the aviation activities centered on airfields and training ranges, finding patterns which may correspond to the military maritime cultural landscape for aircraft remains difficult. Of the large number of recorded losses, only 47 have been located and, with only a few exceptions, these have no clear relationship to ranges or fields. The speed and range of naval aircraft have something to do with this difficulty. In addition, the crash location in 1,115 aviation records is so vague as to prohibit any approximation of position at all (simply listed as “lost Hawaiian Islands”).
Battlefield archaeology in training areas?

The practice of battlefield archaeology provides specific guidance in the interpretation of the military combat landscape. In the U.S., the National Park Service defines battlefields as “sites where armed conflict, fighting, or warfare occurred between two opposing military organizations” (Battlefield Survey Manual 2016). Though they were only attacked a few times, the Hawaiian Islands served as the major staging and logistical support and training center in the Pacific. Intensive combat training was conducted for years both ashore and at sea. Many more aircraft and surface vessels were lost during intensive training exercises during the war years in Hawaii than were lost in the actual attacks. So, while technically not a battlefield, the waters surrounding the Hawaiian Islands feature a large number of WWII UCH resources. Can elements of battlefield analysis be used to examine these sites?

For the interpretation of battlefield and combat training sites, it is important for the archaeologist to view the landscape through the lens of the military planner. The National Park Service provides a helpful acronym summarizing this approach for terrestrial battlefields: KOCOA.

- K = Key Terrain: the importance of holding the high ground
- O = Obstacles: terrain features restricting troop movements
- C = Cover and Concealment: protection from fire and secrecy of movement
- O = Observation and Field of Fire: monitoring the enemy and open vistas
- A = Avenues of Approach and Retreat: transportation network for mobility and supply
The marine environment is expansive, fluid, and dynamic, very unlike the land in many ways. Still, are there naval equivalents to these elements of battlefield interpretation? Some may be proposed perhaps, though they may not all relate to the physical landscape:

- **K = Key Terrain**: altitude in naval aviation; protected harbors for vessels; channels and straits
- **O = Obstacles**: ice; fog; storms; harbor defenses; minefields; reefs and shoals; shoreline infrastructure
- **C = Cover and Concealment**: vessel camouflage; clouds; night operations; depth, temperature and salinity isobaths for submarines
- **O = Observation and Field of Fire**: radio traffic interception; patrols; scout planes; radar; sonar
- **A = Avenues of Approach and Retreat**: approach course; amphibious assault lanes; forward supply bases; air cover; depth for submarines

**Conclusion:**

The methods of battlefield archaeology originated with terrestrial conflicts like Little Big Horn and the American Civil War. Their application to the naval context and the marine environment is a relatively new phenomenon (Russell and Conlin, 2006; McKinnon and Carrell, 2016). The completion of the UCH inventory for the Hawaiian Islands, and the predominance of WWII UCH resources, allows for a small test of these battlefield concepts at the broad landscape level, for amphibious craft and for aircraft in particular. Training exercises are not combat. Nonetheless, certain patterned elements emerge for these large-scale operations, revealed in the locations of amphibious assault vehicles near the assault lanes and the remaining coastal infrastructure of defensive obstacles. (The same
cannot yet be said of naval aircraft despite their large number in the UCH resource base.) That is enough to strongly suggest that, in the interpretation of amphibious battlefields, where hundreds of massed landing craft and assault vehicles are deployed, the maritime cultural landscape approach, and particularly its subset of KOCOA battlefield elements revised for the marine environment, should be considered.

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**Biography:**

Hans Van Tilburg holds a BA in geography from University of California Berkeley, an MA in maritime archaeology/history from East Carolina University, and a PhD in history from the University of Hawai`i, where he ran the graduate program in maritime archaeology and history. Hans has taught courses in world maritime history and published over 30 articles and book reviews, as well as several books. He has served as a consultant for UNESCO’s cultural heritage program and instructor for UNESCO’s UCH Foundation courses. He is currently maritime heritage coordinator and unit diving supervisor for NOAA’s Office of National Marine Sanctuaries in the Pacific.