

A Colonial Shipwreck in Saipan, Northern Mariana Islands

Jennifer McKinnon

East Carolina University, Admiral Ernest M. Eller House, Greenville, North Carolina, USA 27858

Sarah Nahabedian and Jason Raupp

Flinders University, GPO Box 2100, Bedford Park, South Australia, Australia 5001

Previous underwater cultural heritage investigations conducted in the western Pacific's Northern Mariana Islands largely focused on the submerged World War Two remains, despite the islands' rich colonial history. The island chain was the setting of numerous historical occupations including indigenous Chamorro populations, Spain, Germany, Japan and the United States, all of which created a lasting maritime heritage legacy on land and under water. This paper presents the first colonial shipwreck investigation to be undertaken by archaeologists and fills a gap in our history and knowledge of the Mariana Islands' pre-World War Two era.

© 2015 The Authors

Key words: Mariana Islands, colonial shipwreck, cultural heritage management, Saipan.

The identification of a previously undocumented shipwreck site in Tanapag Lagoon on the western side of Saipan, in the Northern Mariana Islands, has shed light on a little-studied aspect of the island's colonial legacy (Fig. 1). Since the initial migration to the Mariana Islands around 3500 years ago by what is now recognized as the Chamorro culture (Bellwood, 1985; Butler, 1994), numerous cultural groups have subsequently used the island of Saipan for settlement, trade, provisioning, and as a strategic position during war. Each of these episodes included maritime activities that left lasting marks on the island's maritime cultural landscape and seascape. While initiatives of the past century, such as harbour enhancement and maritime infrastructure development, created structures that still feature prominently on the waterfront, those of the earlier colonial periods produced a far less visible signature. Thus, the location and investigation of a colonial wooden shipwreck in Tanapag Lagoon provides insight into maritime activities of the period, and also highlights the archaeological potential of colonial period heritage that exists hidden beneath the surrounding waters.

For this study, only the islands of the Commonwealth of the Northern Mariana Islands are included, excluding Guam.

Maritime activities and ship losses

From the late 15th century, the Pacific Ocean served as a highway for European nations by aiding the

movement of people and the colonization of new areas (Buschmann *et al.*, 2014). Ferdinand Magellan was the first known European to visit the Mariana Islands and in 1521 he named the archipelago 'Islas de los Ladrones' (Islands of the Thieves) as a result of cultural misunderstandings. Over the next 40 years Spanish merchant ships passed through the region while exploring possible trade routes. During this early exploration period only one vessel is recorded lost in the Mariana Islands; in 1522 the caravel *Santa Margarita* was wrecked somewhere in the general vicinity of the 'Ladrones' (Brunal-Perry *et al.*, 2009: 99).

In 1565 a standard route for the Manila Galleon trade was established, and over the next 250 years the islands served as a strategic provisioning location for merchant ships engaged in annual voyages between Spain's outposts at Manila in the Philippines and Acapulco on the western coast of Mexico (Moses, 1929: 75; Cushner, 1971; Skowronek, 1998: 47). Although this system proved to be highly successful, it also resulted in two significant shipwrecks in the 'Ladrones': in 1600 the galleon *Santa Margarita* was lost at the island of Rota, and in 1638 the galleon *Nuestra Señora de la Concepcion* wrecked at Saipan. The remains of these vessels have been identified; however, both were impacted by commercial treasure-salvor ventures and little archaeological investigation was undertaken. A final report for the salvage of *la Concepcion* was produced (Mathers *et al.*, 1990) and a large percentage of the recovered artefacts were purchased by the Commonwealth of the Northern Mariana Islands (CNMI) Government and are now on display in the

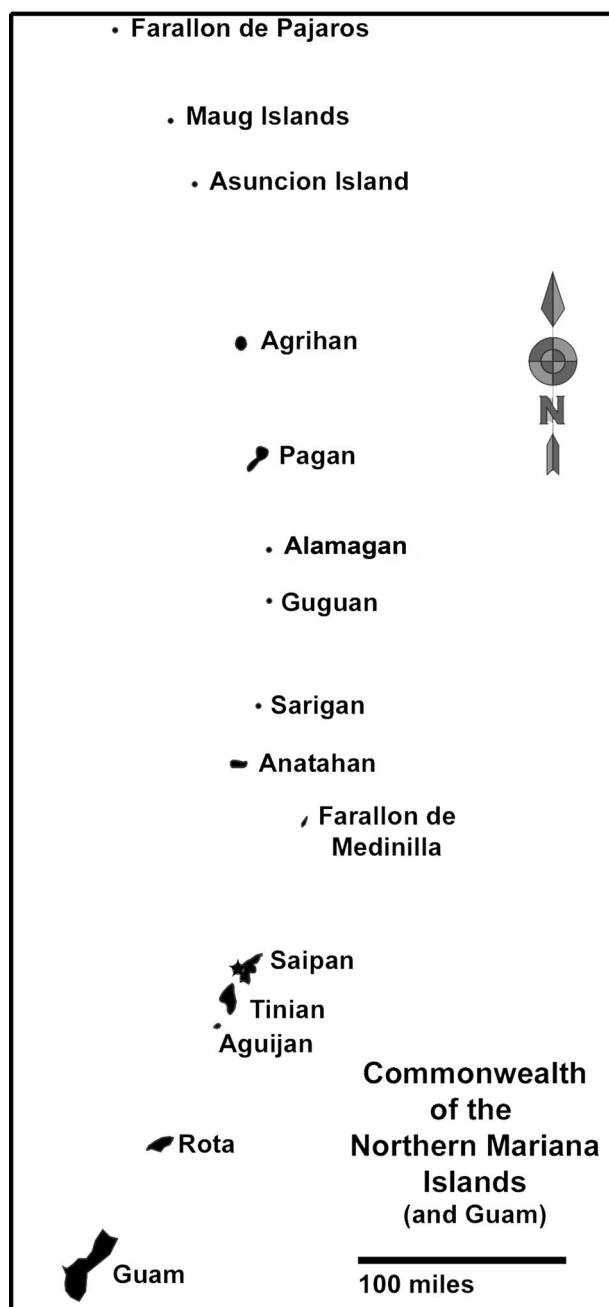


Figure 1. The Mariana Islands. (Jennifer McKinnon)

Northern Mariana Island Museum of History and Culture on Saipan. No final report was produced for the salvage undertaken on the wreck of *Santa Margarita* and due to environmental violations, operations on the site were suspended in 2006 and have not resumed (pers. comm. Ronnie Rogers).

In 1667 Spain officially claimed the island chain and named it 'Las Marianas' in honour of Queen Mariana of Austria (Coomans, 2000). Spanish occupation of the islands began in 1668 and by the late 17th century, Spanish efforts to Christianize the Chamorro people

resulted in large groups being forcibly removed from the northern islands and resettled into church-centred villages on the island of Guam (Hezel, 1983; Carrell, 1991). Though missions were also set up on Saipan and Rota, until the end of the 19th century these islands served mainly as ranches or infirmaries. In the early 1800s Spanish authorities granted a request from a group of voyagers from the central Caroline Islands to establish a settlement on Saipan. While this episode ushered in a new population to the archipelago (Russell, 1984: 2), groups of Refaluwasch people, or Carolinians, were in contact with the islands prior to that time (pers. comm. Scott Russell).

The Spanish colonial period spanned from 1667 to 1898 and during that time a number of shipwreck events occurred in the Marianas. Though most of these involved vessels related to intra- or inter-island transport, a few were trans-Pacific ships engaged in trade. During this period the types of watercraft that most frequented the waters of the Mariana Islands were predominantly small coastal vessels such as *bancas* and packets. *Bancas* were indigenous canoes constructed by either Chamorro or Carolinian builders, while packets were larger, European-designed and rigged vessels either constructed locally within Spanish shipyards or transported to the islands from the Philippines (Brunal-Perry *et al.*, 2009). Both of these vessel types were used primarily for transport, performing duties such as delivery of supplies and mail or carrying passengers. Although a total of ten *bancas* and packets are recorded as having been wrecked in the waters of the Mariana Islands during this period, the number is likely to be higher because of discrepancies in recording small vessel losses (Table 1).

During the early part of the Spanish colonial period, vessels from other nations involved in ocean-going trade and exploration occasionally called at the Mariana Islands. As maritime traffic through the region increased, Pacific archipelagos such as the Marianas were regularly visited by whaleships and trading vessels seeking to resupply and rest (Raupp, 2015: 42). Throughout the 19th century, schooners, corvettes, frigates, ships, brigs, barks and steamers all frequented the Marianas. Though many vessel losses are known to have occurred (Lévesque, 2002), with the exception of the two previously mentioned galleons, shipwreck sites relating to the Spanish colonial period have, until recently, remained undocumented (Table 1).

Subsequent to loss in the Spanish-American War in 1898, Spain's Micronesian possessions, except Guam, were sold to Germany beginning what is referred to as the German Colonial Period (Spennemann, 2007: 7). During the German Period (1899–1914), Saipan was the sole port of entry for foreign vessels visiting the archipelago. The settlement of Garapan on the west coast served as the administrative seat of the Marianas District (Spennemann, 2009: 167) and between 1898 and 1907 development projects included an administration building near the foreshore that was

Table 1. *Known colonial period shipwrecks in the Northern Mariana Islands (Drawn from Fairburn, 1945; Ward, 1967; Lévesque, 2002; Carrell, 2009)*

Name	Year Lost	Ship Type	Location
<i>Santa Margarita</i>	1552	Caravel	Ladrones
<i>Santa Margarita</i>	1600	Galleon	Rota, Atetito
<i>Nuestra Señora de la Concepcion</i>	1638	Galleon	Saipan
Name unknown	1648	Sampan	Saipan
Name unknown	1696	Schooner	Saipan
<i>San Fernando</i>	1732	Banca (canoe)	Rota
Name unknown	1740–46	Presidio ship	Guam-Tinian
<i>Nuestra Señora de Lumen</i>	1746–49	Presidio ship	Rota
<i>Santo Domingo de Guzman</i>	1746	Presidio ship	Rota
Name unknown	1759–68	Banca (canoe?)	Guam-Tinian
<i>San Carlos</i>	1766	Frigate	Ladrones
<i>San Felipe</i>	1776–86	Presidio ship	Rota
<i>San Lorenzo</i>	1786–94	Banca (canoe)	Ladrones
<i>San Fernando</i>	1786–94	Banca (canoe)	Rota
<i>San Antonio</i>	1786–94	Banca (canoe)	Guam-Tinian
<i>San Francisco</i>	1786–94	Banca (canoe)	Rota
<i>San Jose</i>	1789	Banca (canoe)	Rota-Guam
<i>San Vicente</i>	1789	Banca (canoe)	Guam-Tinian
<i>Bramin</i>	1797–98	Brig	Tinian
<i>Espermen</i>	1798	Packet boat	Tinian
Name unknown	1806–12	Banca (canoe)	Rota-Guam
<i>Resource</i>	1819	Type unknown	Ladrones
<i>Candida</i>	1829–37	Brigantine	(?)
<i>Falcon</i>	1829–37	Whaler	Ladrones
<i>Isabella</i>	1842?	Frigate	Marianas (?)
<i>Courrier des Indes</i>	1847	Type unknown	N. Mariana Is.
<i>Canton</i>	1848	Frigate	Tinian
<i>Austerlitz</i>	1851	Type unknown	N. Mariana Is.
<i>William T. Sayward</i>	1854	Bark	Mariana Is.
<i>Lizzie Jarvis</i>	1855	Whaler	Saipan
<i>William Badger</i>	1856	Type unknown	Anatahan
<i>La Chamorrta</i>	1857	Brig	Guam
<i>San Francisco de Borja</i>	1862	Banca (canoe)	Guam-Rota
<i>Maria Del Rosario</i>	1872	Bark	Tinian
<i>San Jose</i>	1874	Schooner	Mariana Is.
Name unknown	1876	Bark	Saipan
<i>F.H. Drews</i>	1888	Type unknown	Mariana Is.
<i>Iolanthe</i>	1896	Schooner	Saipan
<i>Garapan</i>	1905	Schooner	Saipan

visible to approaching ships, a landing pier, and small boat harbour along the waterfront (Fritz, 1901: 34–46). Although Germany held claim to the Northern Mariana Islands throughout this period, Japanese merchants controlled trade and held a monopoly on transport to and from the islands (Peattie, 1988: 22). While attempts by German shipping companies were made to replace Japanese transports, none were successful. Only limited data is available pertaining to shipping or local intra-island transport and trade during this period; however, it is estimated that 25–30 vessels called at Saipan annually (Spennemann, 2009: 188). Though typhoons caused substantial damage to German and Japanese merchant maritime infrastructure each season (Spennemann, 2004), few

shipwrecking events were reported during this period, and as yet no archaeological remains have been identified.

Shortly after Japan declared war on Germany in World War I (WWI), German officials in Saipan abandoned their post and Japanese occupation of the Northern Marianas was officially sanctioned by the United Nations. The Japanese government and private industries wasted no time in increasing maritime works in the harbour, which included the construction of a lighthouse and channel markers to guide ships entering and leaving Saipan's harbour. The Japanese Imperial Navy controlled all traffic in the Marianas and smaller shipping companies required special permits to run their routes (Ballendorf, 1984: 84), which

restricted maritime activity to Japanese-owned vessels. Locally, fishing became a major industry for some Japanese merchants, most of whom were of Okinawan descent. The largest boats could accommodate up to 30 fishers and trolled the waters for pelagic species such as bonito (Peattie, 1988: 139–40). Larger companies eventually entered the fishing business, establishing commercial fleets and fish processing plants on Saipan. Unfortunately no data pertaining to shipwrecking events during the Japanese pre-war colonial period is known to exist and no shipwreck sites dating to this period have been identified.

Maritime research in the CNMI

Over the past 30 years, underwater cultural resources of Saipan have been the subject of both archaeological surveys and commercial treasure salvor activities. Between 1979 and 1985, surveys conducted by the United States (US) National Park Service (NPS) and private archaeological consulting firms resulted in the location and assessment of submerged World War II (WWII) remains in Saipan (Thomas and Price, 1980; Miculka and Manibusan, 1983; Miculka *et al.*, 1984; Pacific Basin Environmental Consultants, 1985). In 1986 and 1987, a treasure salvage company, Pacific Sea Resources, commercially salvaged the 1638 shipwreck of *Nuestra Señora de la Concepción* off the south coast of Saipan (Mathers *et al.*, 1990). In 1990 the NPS again documented WWII sites in the lagoons on Saipan (Miculka *et al.*, 1990) and in 1991 published a comprehensive submerged cultural resources report for all of Micronesia, which included details of more than 50 shipwrecks and abandoned vessels in Saipan (Carrell, 1991).

Although for the next decade little research or fieldwork pertaining to maritime heritage was conducted in Saipan's waters, in 2001 the National Oceanic and Atmospheric Administration (NOAA) initiated an abandoned vessel inventory for the CNMI (Lord and Plank, 2003). Beginning in 2008, interest in Saipan's underwater cultural heritage was reignited when the Historic Preservation Office supported an extensive remote sensing and diver identification survey of Saipan's western lagoons (Burns, 2008a; Burns, 2008b) and the completion of a CNMI-specific maritime history overview (Carrell, 2009). Using the results of the 2008 survey and 2009 report, a research project was initiated in 2009 by researchers from Ships of Exploration and Discovery Research, Inc. and Flinders University with the aim of documenting the submerged remains of the WWII Battle of Saipan. This project resulted in the creation of an underwater heritage trial, 2D and 3D interpretive films, an *in situ* conservation survey of selected sites, and a management plan for submerged WWII heritage located in the lagoons (McKinnon and Carrell, 2015).

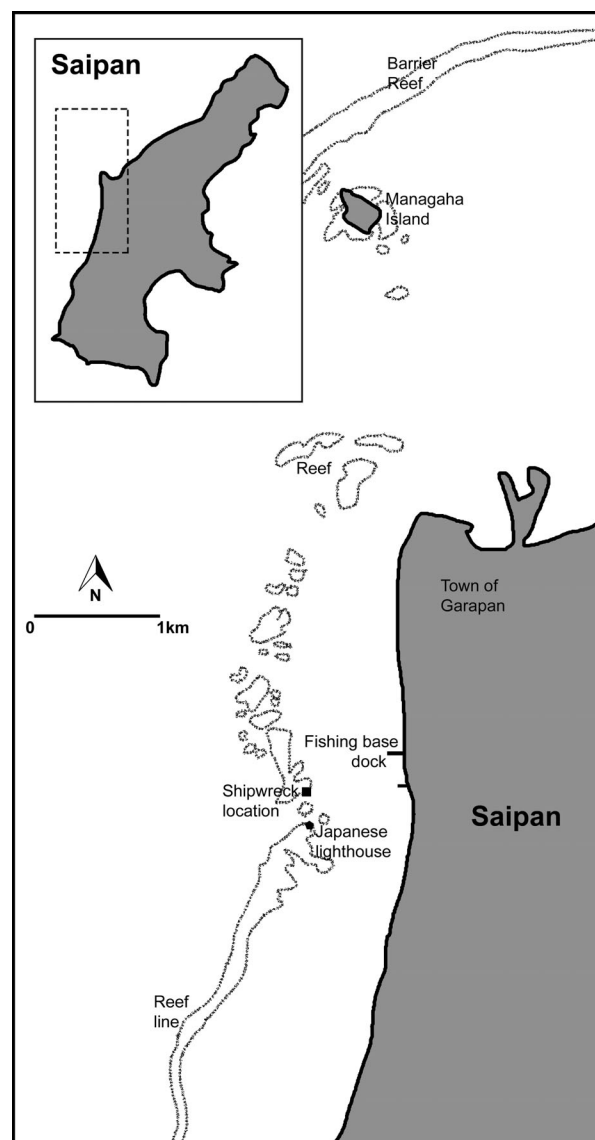


Figure 2. Japanese Light Shipwreck location. (Jennifer McKinnon, based on the United States Geological Survey, 2009)

Colonial shipwreck investigation

In July 2010 a marine biologist, John Starmer, from the CNMI Coastal Resources Management Office (CRM) in Saipan, notified maritime archaeologists from Flinders University of a possible wooden shipwreck site in Tanapag Lagoon (Fig. 2). Upon inspection, several shards of green bottle glass, iron and copper-alloy fasteners, ballast stones, and burnt timbers were found encrusted in the reef and sand. Archaeologists initially assessed these remains as late 19th-century artefacts associated with a possible shipwreck or anchorage debris field. Due to proximity of a pre-war Japanese channel marker, the site was referred to as the 'Japanese Light shipwreck' and reported

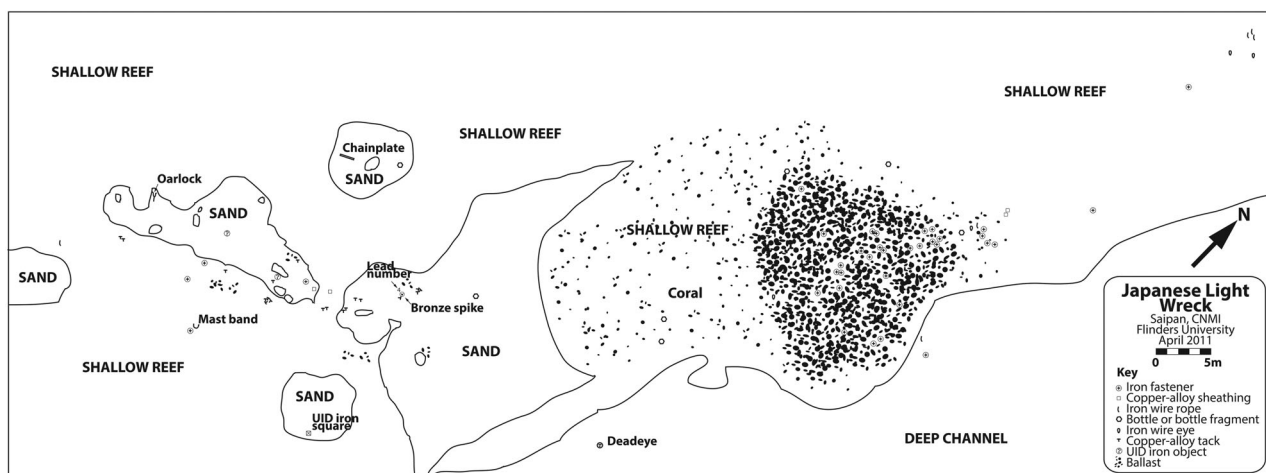


Figure 3. Site plan of Japanese Light Shipwreck. (Jennifer McKinnon and Sarah Nahabedian)

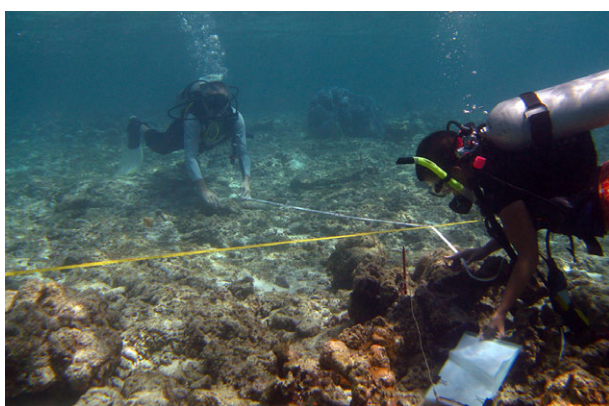


Figure 4. Divers working in the shallow reef-top environment. (Sarah Nahabedian)

to the CNMI Historic Preservation Office (HPO) (Fig. 3). As so few pre-WWII maritime-related sites are documented in the waters surrounding Saipan, further investigations were planned. In 2011, a joint one-week project was undertaken by Flinders University staff and students and CRM, HPO and the Division of Environmental Quality (DEQ) offices (McKinnon *et al.*, 2011; Nahabedian, 2011). The project was non-invasive and consisted primarily of visual survey and mapping, and artefact identification. No artefacts were removed from the site, although some were brought to the surface for photography and returned to their original location.

The Japanese Light shipwreck site is located in Tanapag Lagoon near the southern approach channel leading to what is known locally as Fishing Base Dock. Situated directly on the coral reef in shallow water, the site is colonized by a variety of hard and soft corals, as well as other marine flora and fauna (Fig. 4). Archaeological material associated with the site is scattered over an area measuring approximately

90×30 m and extends in a westerly direction down the reef slope and into smaller sandy passages that lead into the deeper, navigable channel. The site is characterized by a large, dispersed mound of small to medium ballast stones and a scatter of artefacts related to a wooden sailing ship.

Remains of the ship

The wooden hull of this vessel has been subjected to both cultural and natural impacts, as evidenced by the scant wooden remains that are visible on the seabed. The few small pieces of timber recorded at the site demonstrate both extensive woodborer activity and evidence of burning through charred surfaces and blackened discoloration. The effects of woodborers is an obvious and accepted natural impact; however, burning could have been a result of salvage attempts in which the ship was burnt to the waterline to access cargo in the hold or to recover metal. Additionally, the site is located on the crest of a shallow reef that is exposed to weather conditions and continuous channel wash, both of which would increase structural degradation (Fig. 4).

Among the limited timber remains identified was a composite artefact of indeterminate function and consisting of wood, iron, and copper-alloy metal. The relatively well-preserved wooden component of this artefact allowed for a timber sample to be recovered and used for species identification. The species of this sample was determined to be birch (*Betula* sp.), with *Betula alleghaniensis* (yellow birch) being the most likely identification (pers. comm. Jugo Ilic). While birch is a hard, durable species of wood that is widespread throughout the northern hemisphere, yellow birch is native to eastern North America, from Newfoundland to Nova Scotia, New Brunswick, southern Quebec and Ontario, and the south-east corner of Manitoba, west to Minnesota, and south to northern Georgia

within the Appalachian Mountains (Forest Products Laboratory Manual, 1973: 1). Possessing a resistance to rot when exposed to moisture and air, yellow birch was commonly used for keels and floor timbers in mid to late 19th and early 20th century shipyards in New England. It was considered superior to oak because it did not contain acid that corroded iron drift pins. Birch was also used extensively for shipbuilding in Canada's maritime provinces during the 'great shipbuilding days of the mid-nineteenth century' (Greenhill, 1988: 205).

A large concentration of coarse gravel ballast known as shingle (Dana, 1841: 97) was recorded at one end of the site and smaller quantities were noted to be scattered throughout the site. The stones are black and grey in colour, range in size from 30 to 150 mm, and are mostly oval in shape; typical of water-smoothed cobble. The concentrated area of ballast stones lies on top of the reef and spans south-west towards the channel; small pockets of ballast were also found in reef crevices and sand pockets to the east as the reef slopes into the channel. No tests were conducted to determine whether wooden structure exists under the ballast scatter; however, given that the scatter appears to be laying directly on the coral substrate it is unlikely wooden remains exist.

Aside from ballast stones, the most common artefact type recorded on the site was fasteners. Iron, copper, or copper-alloy fasteners were used to either secure members of a ship's frame solidly together, or to fix moveable objects (Bathe, 1978: 3.02). Due to the corrosive environment of seawater, iron bolts were generally installed above the waterline, while copper or copper-alloy bolts were used below it (Crothers, 1997: 61; Burns, 2003: 56; McCarthy, 2005). As an example of this widespread pattern, Fincham's (1851) *A History of Naval Architecture* relates, 'copper is used below the water, and to about two feet above its surface, and at the bows all the way up; and iron in the remaining part of the upper-works' (McCarthy, 2005: 110).

At the Japanese Light wreck site, 43 large bolts or drift bolts (as defined by McCarthy, 2005: 180) were found embedded in the coral substrate. Due to heavy concretion, the positive identification of these artefacts was difficult; however the general shape (straight body and presence of a head on most), length and size indicate a type of bolt. Most of these fasteners ranged from 300–400 mm in length and were approximately 35 mm in diameter.

Several copper-alloy fasteners were also identified on the site. Among the most diagnostic of these was a single copper-alloy dump or short bolt (as defined by McCarthy, 2005: 179) located in a sand pocket. Normally made from bronze or other copper-alloy metals, dump bolts incorporated a rounded head and a round shaft that tapered to a chiselled end and were generally used to attach planking to frames (Stone, 1993: 34, Crothers, 1997: 70; Burns, 2003: 56; McCarthy, 2005: 179). Other copper-alloy



Figure 5. Tacks and sheathing. (Jennifer McKinnon)

fasteners included 31 sheathing tacks, which were found distributed across the site in sand pockets in the reef (Fig. 5).

A number of small fragments of copper or copper-alloy sheathing were found concreted into the limestone substrate, as well as loose in sand pockets south-west of the ballast area. To protect vessels from marine organisms such as the shipworm (*Teredo navalis*) and gribble (*Limmoria*), a layer of protective sheathing was typically attached to the outer hull of a vessel below its waterline (Bathe, 1978: 3.10; Burns, 2003: 61–2; McCarthy, 2005: 101–2; Van Duivenvoorde, 2015). Though soft woods and lead were used to sheath early wooden ships, copper was the first effective barrier against fouling (Stone, 1993: 23). Introduced into the Royal Navy in 1761, British merchantmen were first coppered in the 1770s, and by 1800 US vessels adapted the technology (Stone, 1993: 23). In 1832, a copper-alloy sheathing material known as Muntz metal was introduced that proved to be tougher, longer wearing, and less expensive than copper (Stone, 1993: 23; Crothers, 1997: 330; McCarthy, 2005: 115–21). Although copper sheathing was still commonly used throughout the later decades of the 19th century, by the 1850s Muntz metal had become the most widely used sheathing material (Burns, 2003: 63). The sheathing on this site appeared to be copper-alloy but not specifically Muntz, as it lacked the yellowish colour typical of Muntz.

A crumpled lead object thought to be a draught number was located in a sand pocket at the site. Due to its diagnostic potential, this artefact was recovered for documentation and when unfolded revealed the shape of an incomplete Arabic number '4' (Fig. 6). These marks appeared on the stem and sternpost of wooden ships and indicated the vertical distance from the lowest point on the hull and were used to adjust trim (Bathe, 1978: 301; Steffy, 1994: 270). US merchant sailing ships of the 19th century often employed lead draught marks, known as load lines (Ronnberg, 1980:



Figure 6. Draught mark. (Jennifer McKinnon)

134). Similar artefacts have also been found on other historic-era shipwreck sites including the British frigate *Dartmouth* wrecked 1690 (Martin, 1978: 35), the royal yacht *Ha'aheo o Hawaii*, lost in 1824 (Johnston, 1998: 101) and the former slaver *James Matthews* wrecked in 1841 (Henderson, 2007: 240–7).

Other ship-related artefacts found at the site include elements of rigging. Among these are numerous sections of iron rope with a fibrous hemp core and a right-hand lay (Bathe, 1978: 5.06). Wire rope made from strands of steel or soft iron wrapped around a hempen core were used in England as early as the 1830s and 1840s (Wallace, 1855: 194; MacGregor, 1984: 150–1; Murphy, 1993: 265; Stone, 1993: 69; Meide, 2000: 221; Burns, 2003: 48–49; Martin, 2014). By the early 1850s most large British ships employed wire standing rigging (MacGregor, 1984: 151) and by the 1860s wire rigging was used by many US shipbuilders (Stone, 1993: 69). Wire rope reduced top-hammer weight, allowing the use of taller masts and larger sails (Murphy, 1993: 265) and by around 1900 it was used almost exclusively for standing rigging (Stone, 1993: 69). Though most of the fragments recorded at the site were relatively short and slightly curved, four concreted wire eyes were found scattered on the shallow coral reef (Bathe, 1978: 5.03). These pieces likely represent end sections and would have been used to connect these lines to other components of standing rigging.

A single wooden deadeye with a heavily concreted iron strop was identified and recovered for documentation. Deadeyes were typically constructed using a hardwood, such as *lignum vitae*, which is resistant to rot and insect infestation (Desmond, 1919: 204). Wooden sailing ships generally employed four to six different sizes of deadeyes for various uses

within its rigging (Burns, 2003: 64). It is likely that this artefact survived due to the type of wood and the protective concretion that formed around it as a result of corrosion of the iron strop.

A single iron chainplate assembly was also found concreted into the reef. Part of a ship's standing rigging, chainplates were bolted to its side and shrouds were then secured to them through a system of deadeyes and screws (Bathe, 1978: 4.08; Stone, 1993: 72). Round, iron bar-stock chainplates were used earlier than flat-bar chainplates, which appeared in the latter part of the 19th century (Murphy, 1993: 285). Unfortunately due to heavy concretion, it was impossible to determine *in situ* if this artefact was fashioned using bar-stock or flat-bar materials.

Half of a possible mast band was also located in a small, sandy pocket in the reef and was recovered for documentation. Constructed of copper alloy or iron, these objects were used to secure the components of a ship's masts (Stone, 1993:64). Mast bands were often constructed in pieces that were clamped together using lugs and some included eyes, which could be used for attaching tackle (Bathe, 1978: 4.02; Burns, 2003: 46–7).

A heavily concreted metal oarlock was found in a large sand pocket on the site. The U-shaped fitting identified at the Japanese Light shipwreck site may have been associated with a gig or lifeboat, which would have been propelled by oars (Bathe, 1978: 9.01).

Shipboard items

Relatively few of the artefacts documented at the Japanese Light shipwreck site are thought to have been associated with provisioning or cargo. Fifteen intact bottles and numerous bottle fragments were identified scattered throughout the site and in the channel, and of these, nine were recovered for surface recording. All of the bottles recorded are associated with the transport or storage of alcoholic beverages and some displayed typical 'kick-up' bases (Jones and Sullivan, 1989: 113) and applied lips. The presence of an applied lip on a bottle indicates that the mouth was formed after being separated from the blowpipe and that it was made before 1900 (Tibbitts, 1964: 3; Adams, 1969: 114).

Among the bottles documented, two proved to be diagnostic. The first was a dark green bottle that exhibited seam lines indicating that it was constructed in a three-piece mould. Used generally between the 1820s and the 1920s, three-piece bottles of dark-green glass were used exclusively for liquor until 1840 (Jones and Sullivan, 1989: 30). Although moulds were no longer used for constructing liquor bottles by the late 19th century, they found continued use for holding pharmaceuticals, toiletries, inks, and other liquids (Jones and Sullivan, 1989: 29–30). The second bottle that proved to be diagnostic was made of light-green glass. This artefact displayed a horizontal seam around the shoulder, indicating two-piece-mould construction.



Figure 7. Stoneware ceramic sherd. (Jennifer McKinnon)

Table 2. Diagnostic artefact date ranges

Artefact	Time period
Wire rope	1830–1900
Hemp wire rope	1850–1870
Copper sheathing	1770–1900
Three-piece mould bottle	1820–1920
Two-piece mould bottle	1870–1880

Other marks noted on the surface of this bottle suggest a turn-mould (Jones and Sullivan, 1989: 31), a style that was most common from the 1870s until WWI (Toulouse, 1969: 532).

In addition to glass, two ceramic fragments were located on the site. These included a stoneware body/rim fragment and a porcelain rim sherd (Fig. 7). The stoneware fragment was of a compact light-grey paste with a 21 mm-thick rim. No diagnostic features were visible on this sherd, but its function is most likely utilitarian. The blue-on-white porcelain sherd is decorated on both sides with geometric and floral patterns with a 3 mm-thick rim. This sherd was determined to have been part of a shallow bowl or saucer with a reconstructed diameter of 40 mm.

Site interpretation

Archaeological and historical data suggest that the remains of the Japanese Light shipwreck site are those of a mid to late 19th-century ship (Table 2). The presence of ballast stones, copper or copper-alloy sheathing, and iron drift pins and bolts indicate that it was constructed of wood, while the hemp-core wire

rope, wooden deadeye, and chainplate specify that it was rigged for sail. The small collection of glass and ceramic fragments also suggest use during the mid 19th to early 20th century. Analysis of the timber sample identified yellow birch, a species found in north-eastern North America and commonly used in shipbuilding. While this does provide some evidence to suggest the use of North American timber, one sample is certainly not conclusive of construction origin.

The close proximity of the ballast area to the channel could suggest that the vessel hit the reef and wrecked while entering or exiting the lagoon. Another scenario, which may be more likely, is that the vessel was moored at the nearby dock or anchorage when it parted lines and was blown on to the reef. With the exception of monsoons, which may bring short periods of south-westerly winds, Saipan is historically recorded as having predominantly east winds throughout the year (Lander, 2004: 5). If a vessel was moored at what is now known as Fishing Base Dock or in the boat basin just to the south, it is possible that a heavy easterly wind could have pushed it directly on to the reef.

The shallow and accessible nature of the site, the breadth of the scatter, and the fact that no cargo and very little removable or reusable items remain, are all possible indications of salvage. Sometimes wrecked wooden vessels were burnt to their waterlines so that cargo stored below the deck could be salvaged and metal fasteners could be easily removed for recycling. The identification of burnt wood during the February 2010 fieldwork and the overall lack of timber on the site could be taken as further evidence of salvage efforts. It is important to note, however, that the exposed conditions experienced in this location and the abundance of marine wood-boring organisms in the tropical waters would definitely have aided in the degradation of any wooden remains, regardless of whether the vessel was salvaged or burnt.

Though data pertaining to ship losses during the mid 19th and early 20th centuries is sparse, historical records indicate that seven wooden sailing vessels were wrecked in and around Saipan during that time (Carrell, 1991: 280). A comparison of the available historical data pertaining to those losses and the archaeological evidence from the Japanese Light wreck site indicates four possible candidates for the identity of the shipwreck. These are:

William T. Sayward (1854): A barque built in Rockland, Maine in 1853 (Fairburn, 1946: 3421). Historic accounts state that it was sailing from San Francisco to Shanghai with a cargo of flour and \$164,000 in specie, when it sprang a leak off the 'Ladrone Islands' and was abandoned on 21 December 1854 (*Salem Register*, 1855; 19 March 1855).

Lizzie Jarvis (1855): Conflicting reports about the sinking of this ship present some discrepancies about its fate and identity. One source indicates that the whaler *Lizzie Jarvis* was lost in the 'Ladrone Islands' while travelling from Hong Kong to San Francisco

in 1855 (Ward, 1967: 187). A later report states that this ship was actually *John N. Gossler*, another vessel of the same owner that traded between the US and China and wrecked in 1855 approximately 150 miles north-east of Saipan (Ward, 1967: 187–8; Lévesque, 2002: 73). Though the loss location of *John N. Gossler* would exclude it from consideration, the confusion surrounding the loss of *Lizzie Jarvis* makes it a candidate.

Unknown barque (1876): One reference indicates that an unidentified barque was lost in 1876 at an undisclosed location in Saipan (Carrell, 1991: 280). Although further historical research failed to ascertain any information about this shipwreck, the date and general locale of its sinking indicate a possible association.

Iolanthe (1896): The 103-ton American-built schooner *Iolanthe* was shipwrecked at Saipan in 1896. Although little information pertaining to this vessel was located, it was built in Essex, Massachusetts in 1883 (Record of American and Foreign Shipping, 1896). The date of its loss and its origins make it a candidate.

Conclusion

Unfortunately, the dearth of information pertaining to the four ship losses described above prevents any of them being positively identified as the Japanese Light shipwreck. The fact that no port or harbour records are known to exist for any of Saipan's colonial periods further restricts the amount of historical knowledge for the area.

As of 2015, no comprehensive historical or archaeological survey focusing specifically on colonial period maritime activities has been conducted in the Northern Mariana Islands. More historical research

into vessel losses during the colonial period would undoubtedly lead to a greater understanding of maritime activities and future site identification. A systematic underwater survey for other sites of this period, as well as excavation on the Japanese Light shipwreck, could lead to new information about the identity of the site. Additionally, no methodical investigation of the shore has been undertaken; such a survey would provide a more complete account of the colonial maritime activities in the region.

Until the Japanese Light shipwreck was located and investigated, a near 400-year gap existed in the archaeological record for the Northern Mariana Islands' maritime heritage. The detailed study of the remains of this 19th-century sailing vessel has produced more than just archaeological data that contributes to the growing database of sites in the waters surrounding Saipan. It has also provided the impetus for building a more comprehensive database of archival information relating to colonial ship losses and therefore helps to better understand the island's maritime activities during that time.

The investigation of the Japanese Light shipwreck represents the first multi-agency archaeological investigation of an underwater pre-WWII shipwreck in Saipan. This approach allowed multiple local government agencies (HPO, CRM and DEQ) to collaborate with archaeologists from Australia and the US to assess and record the site. As a result of the site's location along the fringing reef, it has also allowed agencies concerned with reef health and environmental quality an opportunity to monitor and protect the reef that has grown around it. This kind of collaboration offers all groups involved the opportunity to better understand and appreciate each other's work and can be seen as best practice for the protection and management of Saipan's marine resources.

Acknowledgements

The authors would like to thank the HPO, particularly archaeologists Ronnie Rogers and Herman Tudela, for their continued support. Thank you to CRM staff John Starmer for showing us the site's location and John D. San Nicolas for his support on the island. Thanks also to DEQ for providing a working platform and in particular to John Iguel for logistical support. Thanks to the field crew: Della Scott-Ireton, Peter Harvey, Julie Mushynsky, John D. San Nicolas and Ania Legra. Thanks to Jugo Ilic of Know Your Wood for species identification. Finally, thank you to the reviewers for their useful input.

References

- Adams, J. P., 1969, *Bottle collecting in New England: A guide to digging, identification, and pricing*. Somersworth.
- Ballendorf, D. A., 1984, Secrets without Substance: U.S. intelligence in the Japanese mandates, 1915–1935. *The Journal of Pacific History* 19.1, 83–99.
- Bathe, B. W., 1978, *The visual encyclopaedia of nautical terms under sail*. New York.
- Bellwood, P., 1985, *Prehistory of the Indo-Malaysian Archipelago*. Sydney.
- Brunal-Perry, O., Driver, M. and Carrell, T., 2009, Early European Exploration and the Spanish Period in the Marianas 1521–1898, in T. Carrell (ed.), *Maritime history and archaeology of the Commonwealth of the Northern Mariana Islands*, 95–139. Santa Fe.
- Burns, J. M., 2003, *The life and times of a merchant sailor: The archaeology and history of the Norwegian ship Catharine*. New York.
- Burns, J. M., 2008a, Archaeological survey of lagoons on the West Coast of Saipan, Commonwealth of the Northern Mariana Islands. Report prepared for the Division of Historic Preservation, Commonwealth of the Northern Mariana Islands, Saipan.

- Burns, J. M., 2008b, Archaeological survey of Tanapag Lagoon Saipan, Commonwealth of the Northern Mariana Islands. Report prepared for the Division of Historic Preservation, Commonwealth of the Northern Mariana Islands, Saipan.
- Buschmann, R. F., Slack Jr., E. R. and Tueller, J. B., 2014, Navigating the Spanish Lake: The Pacific in the Iberian World, 1521–1898. Honolulu.
- Butler, B., 1994, Early Prehistoric Settlement in the Mariana Islands: New evidence from Saipan. *Man and Culture in Oceania* **10**, 15–38.
- Carrell, T. (ed.), 1991, *Micronesia submerged cultural resources assessment*. Southwest Cultural Resource Centre Professional Papers No. 16. Submerged Cultural Resources Unit, National Park Service, Santa Fe, New Mexico.
- Carrell, T. (ed.), 2009, Maritime history and archaeology of the Commonwealth of the Northern Mariana Islands. Report prepared for the Division of Historic Preservation, Commonwealth of the Northern Mariana Islands, Saipan.
- Coomans, P., 2000, *History of the mission in the Mariana Islands, 1667–1673*. Translated by Rodrigue Lévesque, Occasional Historical Papers Series, No. 4. Division of Historic Preservation, Commonwealth of the Northern Mariana Islands, Saipan.
- Crothers, W. L., 1997, *The American built clipper ship, 1850–1856: Characteristics, construction, and details*. Camden.
- Cushner, N. P., 1971, *Spain in the Philippines from conquest to revolution*. Philippines.
- Dana, R. H., 1841, *The seaman's friend: A treatise on practical seamanship*. Boston.
- Desmond, C., 1919, *Wooden ship-building*. New York.
- Fairburn, W. A., 1946, *Merchant sail, vol 6*. Massachusetts.
- Forest Products Laboratory Manual, 1973, U.S. Department of Agriculture, Madison, Wisconsin.
- Fincham, J., 1851, *A History of Naval Architecture*. London.
- Fritz, G., 1901, Yearly report 1901. Submitted to Imperial Governor of German New Guinea. Translation on file with Historic Preservation Office, Saipan.
- Greenhill, B., 1988, *Evolution of the wooden ship*. New York.
- Henderson, G., 2007, *Unfinished Voyages: Western Australian shipwrecks 1622–1850*. Crawley.
- Hazel, F. X., 1983, *The first taint of civilization: A history of the Caroline and Marshall Islands in pre-colonial days, 1521–1885*. Pacific Islands Monograph Series No. 1. Honolulu.
- Johnston, P. F., 1998, 1997 Excavations of the Royal Hawaiian yacht *Ha'aheo o Hawaii* in Hanalei Bay, Kauai: Preliminary Report, in L. E. Babits (ed.), *Underwater Archaeology* **1998**, 96–103.
- Jones, O. R. and Sullivan, C., 1989, *The Parks Canada glass glossary for the description of containers, tableware, flat glass and closures*. National Historic Parks and Sites, Canadian Parks Service, Environment Canada, Ottawa.
- Lander, M., 2004, *A rainfall climatology for Saipan: Distribution, return-periods, El Nino, tropical cyclones, and long-term variations*. University of Guam, Water and Environmental Research Institute of the Western Pacific, Technical Report 3, Guam.
- Lévesque, R., 2002, *History of Micronesia*, Bibliography of Micronesia, ships through Micronesia cumulative index, Vol. **20**. Quebec.
- Lord, C. and Plank, C., 2003, Surveys of abandoned vessels: Guam and the Commonwealth of the Northern Mariana Islands. Report Prepared for National Oceanic and Atmospheric Administration, National Ocean Service, Office of Response and Restoration by Research Planning, Inc., Columbia, South Carolina.
- MacGregor, D. R., 1984, *Merchant sailing ships 1815–1850: Supremacy of sail*. London.
- Martin, C. J., 1978, The *Dartmouth*, a British frigate wrecked off Mull, 1690. 5. *The ship. IJNA* **7**.1, 29–58.
- Martin, J. C., 2014, Strands that Stand: using wire rope to date and identify archaeological sites. *IJNA* **43**.1, 151–61.
- Mathers, W. M., Parker, H. S. and Copus, K. A., 1990, *Archaeological report: The recovery of the Manila Galleon Nuestra Señora de la Concepción*. Pacific Seas Resources, Sutton, Vermont.
- McCarthy, M., 2005, *Ships' fastenings: From sewn boats to steamship*. College Station, TX.
- McKinnon, J. F. and Carrell, T. L., 2015, *Underwater Archaeology of a Pacific Battlefield: The WWII Battle of Saipan*. New York.
- McKinnon, J. F., Nahabedian, S. and Raupp, J. T., 2011, *Archaeological Investigations of the Japanese Channel Light Wreck*. Flinders University, Program in Maritime Archaeology Report Series, No. 2. Adelaide, South Australia.
- Meide, C. T., 2000, *An archaeological investigation of the San Marcos shipwreck (8WA501) and a submerged cultural resources survey of the St. Marks River, 29 June to 07 August 1998*. Underwater Archaeological Research Report No. 2, Florida State University Program in Underwater Archaeology, Tallahassee.
- Miculka, J. E. and Manibusan, R. S., 1983, Submerged cultural resources assessment American memorial park. Report prepared for War in the Pacific National Historic Park, Guam.
- Miculka, J. E., Carter, K. J. and Ichihara, H., 1984, Submerged cultural resources assessment Saipan lagoon 03–05 December 1984. Report prepared for War in the Pacific National Historic Park, Guam.
- Miculka, E., Wood, E., Cooper, W. and Blackenbaker, D., 1990, Submerged cultural resources assessment: Saipan. Report prepared for War in the Pacific National Historic Park, Guam.
- Moses, B., 1929, *Spain Overseas*. New York.
- Murphy, L. E. (ed.), 1993, *Dry Tortugas National Park: submerged cultural resources assessment*. Southwest Cultural Resource Centre Professional Papers No. 45. Santa Fe: Submerged Cultural Resources Unit, National Park Service.
- Nahabedian, S., 2011, What's in a name? That which we call a shipwreck. Unpublished Master's thesis, Flinders University.
- Pacific Basin Environmental Consultants, 1985, Underwater survey of Tanapag Lagoon for historic properties. Report prepared for Community and Cultural Affairs, Historic Preservation Office by Pacific Basin Environmental Consultants, Guam.
- Peattie, M. R., 1988, *Nanyo: The rise and fall of the Japanese in Micronesia, 1885–1945*. Honolulu.
- Raupp, J. T., 2015, 'And So Ends this Day's Work': Industrial Perspectives on Nineteenth-century American Whaleships Wrecked in the Northwestern Hawaiian Islands. Unpublished PhD thesis, Flinders University.

- Record of American and Foreign Shipping, 1896, <<http://library.mysticseaport.org/initiative/SPSearch.cfm?ID=556672>> (Accessed 3 June 2011)
- Ronnberg, E. A. R., 1980, The coppering of 19th century American merchant sailing ships; some historical background with notes for model makers. *Nautical Research Journal* **26.3**, 125–148.
- Russell, S., 1984, *From Arabwal to ashes: A brief history of Garapan village 1818 to 1945*. Micronesian Archaeological Survey Report Series vol. 19, Saipan.
- Salem Register*, 1855, Loss of Specie at Sea, daily newspaper published in Salem MA.
- Skowronek, R. K., 1998, The Spanish Philippines: Archaeological Perspectives on Economics and Society. *International Journal of Historical Archaeology* **2.1**, 45–71.
- Spennemann, D. R., 2004, *Typhoons in Micronesia. A History of Tropical Cyclones and Their Effects until 1914*. Division of Historic Preservation, Saipan, Commonwealth of the Northern Mariana Islands.
- Spennemann, D. R., 2007, *Edge of Empire. The German Colonial Period in the Northern Mariana Islands 1899–1914*. Albury.
- Spennemann, D. R., 2009, Transport, Trade and Communications in the German Mariana Islands 1899–1914, in T. Carrell, (ed.), *Maritime history and archaeology of the Commonwealth of the Northern Mariana Islands*, 167–202. Report prepared for the Division of Historic Preservation, Commonwealth of the Northern Mariana Islands, Saipan.
- Steffy, R. J., 1994, *Wooden ship building and the interpretation of shipwrecks*. College Station, TX.
- Stone, D. L., 1993, *The wreck diver's guide to sailing ship artifacts of the 19th Century*. Vancouver.
- Tibbitts, J. C., 1964, *1200 bottles priced: A bottle price guide, catalogue and classification system*. Sacramento.
- Thomas, M. and Price, S., 1980, Cultural resources reconnaissance report for the Saipan small boat harbor study area. Report prepared for US Army Corps of Engineers Pacific Ocean Division by Pacific Studies Institute, Guam.
- Toulouse, J. H., 1969, A primer on mold seams. *The Western Collector* **7.11**, 526–35.
- Van Duivenvoorde, W., 2015, The Use of Copper and Lead Sheathing in VOC Shipbuilding. *IJNA* **44.2**, 349–361.
- Wallace, W. H., 1855, Wire rope. *The U.S. Nautical Magazine, and Naval Journal* **4**, 192–7.
- Ward, R. G. (ed.), 1967, *American activities in the central Pacific, 1790–1870: A history, geography and ethnography pertaining to American involvement and Americans in the Pacific taken from contemporary newspapers etc.* Vol. 4. New Jersey.