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The Maravillas Matrix:
Piecing Together in Time
& Space a Spanish Galleon
in the Northern Bahamas

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The Maravillas Matrix: Piecing Together in Time & Space a Spanish Galleon in the Northern Bahamas

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After the *Nuestra Señora de las Maravillas* sank off the western Little Bahama Bank in January 1656, the remains were heavily salvaged into the 1680s. A modern phase of salvage followed between the early 1970s and early 1990s. What was discovered, and precisely where, was never officially reported. Since 2019, Allen Exploration's archaeological surveys and test soundings have documented and mapped an extensive scatter of material culture varying from ship's fittings and ceramics to silver coins and gold jewelry. The *Maravillas* today is an extraordinarily complex site. In this report, AllenX begins to untangle the impacts – extracting filters and scrambling devices – that led to the creation and development of the scatter trail. By relating the finds to the framework of a galleon matrix, the spatial origins of the artifacts on the *Maravillas* are reconstructed, along with the processes through which the ship broke up and dispersed.

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1. Introduction

Since 2019 Allen Exploration (subsequently AllenX), under license from the Government of The Bahamas, has surveyed the waters west of the Little Bahama Bank for remains of the wreck of the *Nuestra Señora de las Maravillas* (Figs. 1-2). The 891-ton, two-decked Spanish galleon, sunk on January 4, 1656, was heavily salvaged by Spanish wreckers almost immediately after the loss.¹ English and colonial salvors from the Caribbean world and the Americas followed in their wake. An estimated 5 million *pesos*' worth of silver bars, coins and worked silver was recovered between 1656 and 1683.²

In the 1970s and into the early 1990s, modern treasure hunters used highly impactful methods to expose large areas of seabed with minimal documentation. No scientific records have been published about what was found and where. AllenX's remote-sensing surveys have subsequently identified around 8,800 magnetometer targets of potential cultural significance extending predominantly, but not exclusively, southwards away from the main ballast pile (as discovered in the 1970s) for a distance of some of 3.4 kilometers. This sprawling Artifact Scatter Trail (AST) consists of



Fig. 1. The *Axis*, one of AllenX's research vessels, off the western Little Bahama Bank. Photo: © AllenX.

a highly diverse array of non-stratified material culture varying from loose ballast stones, the occasional wooden plank, iron rigging, gun carriage concretions and two iron swivel guns to ceramics, silver *pesos*, silver bars, emeralds, amethysts and gold jewelry.

The purpose of this report is two-fold. Firstly, to explore to what extent AllenX's archaeological finds reveal and reflect the character of daily life on the *Maravillas* in its broadest behavioral sense. The analysis examines the assemblages in relation

to the theoretical framework of the galleon matrix, as first conceived by Dr Duncan Mathewson for the wrecks of the *Nuestra Señora de las Atocha* and the *Santa Margarita* from the Spanish Tierra Firme fleet lost in September 1622 off the Marquesas Keys in southern Florida. Secondly, this report assesses the post-depositional fate of the ship and wreck. Distribution maps of the *Maravillas* assemblages enable the wreck's scattering to be studied geospatially.

2. Scattered Significances

Despite scattered wrecks constituting the most common form of shipwreck archaeology in shallow and exposed coastal areas,³ theory aimed at extracting meaning from this major class of site is meager, particularly in the Americas. Salvage work in 1964 on a Spanish fleet ship lost off Vero beach in Florida in 1715 concluded that the scattered remains were stripped of meaning. "As the locations of specimens were recorded," wrote Carl Clausen, "it became evident that there was little if any spatial relationship between the recovered items... This jumbled context makes them the least rewarding to the marine archaeologist."⁴

The theoretical foundations recognizing how scattered wreck sites can retain archaeological meaning were first introduced in the 1970s by the English maritime archaeologist Keith Muckelroy. Muckelroy defined a scattered site as lacking coherent ship's structure and where the distribution of contents can no longer be directly related to a hull's structure. Noisy data, however, could be processed into meaningful patterns by sub-dividing assemblages into broad categories, including (for his European historical contexts) stoneware potsherds, green bottle glass, clay tobacco



Fig. 2. The AllenX team surveying scattered remains of the *Maravillas* shipwreck off the western Little Bahama Bank. Photo: © Allen Exploration.

pipes, personal possessions, armament, lead shot, fragments of bronze and lead sheeting, bronze nails and bones.⁵

Reconstructing scattered sites requires an ability to identify and explain both the extracting filters at work (processes that remove material from a site during the act

of wrecking, including salvage, so they are no longer present to be discovered) and scrambling devices (processes that move materials from their primary context and rearrange patterns).⁶

Focusing on the Western Mediterranean, A.J. Parker's seminal work on ancient shipwrecks, primarily Roman, emphasized how the concept of sedimentary stratigraphy is usually missing underwater so that sites in marine environments must be studied as systems to a greater degree than on land. Careful recording successfully identified putative associations of groups of distinctive material.⁷

Thirty years after Muckelroy's pioneering theory, Gibbs expanded his theoretical structure by proposing a series of bounded phases that dictate preservation levels, ranging from the Impact Stage (during the disaster event and immediately afterwards) to the Recoil Stage (starting when the immediate threat to life has receded) and the Post-trauma Stage (medium to long-term responses to a disaster). An alternative way of categorizing impacts determining shipwreck preservation, and more productive for the current study, is by examining them through the prism of pre-depositional, depositional and post-depositional structures.⁸

Realities in the Great Lakes have highlighted how the 'Pompeii premise' is a difficult perspective to apply to most shallow water wrecks, particularly when a vessel has broken up and scattered. "Indeed, some underwater archaeologists have suggested

that shallow water wreck-sites are not worth investigation, since they have so little coherent information content,” John O’Shea explains. Rather, he proposes that like many conventional terrestrial archaeological sites, shallow water wrecks should not be viewed as a frozen moment in time, “but rather as a palimpsest of distinct, short-term events and behaviour, created under the joint force of intentioned cultural activities and natural formation processes.” Post-depositional pressures ensure that “Every wreck is unique.”

Focusing on colonial shipwrecks of a specific Spanish origin, Duncan Mathewson’s galleon matrix, developed for the wrecks of the 1622 Tierra Firme fleet off the Florida Keys, proposed a theoretical framework for tying different assemblages to specific behavior patterns unique to varying sections of a galleon, including the stern castle (poop deck, quarter deck, officers and passengers’ quarters), lower deck, cargo hold, forecandle and sail rigging.¹⁰

AllenX’s fieldwork follows Mathewson’s galleon matrix as a constructive theoretical approach and has adapted its structure further by reorganizing

the sections’ order and imposing a numeric code on seven specific spatial zones (Table 1, Fig. 3).

3. The *Maravillas*’ Depositional Pathways

From an archaeological perspective, technically the *Maravillas* still took the form of a coherent site in the modern era. When rediscovered in 1972, the wreck consisted of a centralized ballast heap associated with hull remains and extensive clusters of artifacts.

However, it was swiftly realized that a significant element of wreckage had broken away and scattered southwards. AllenX’s surveys have confirmed, and spatially articulated, this pattern for the first time.

Multiple overlapping mechanisms can be proposed for the extensive scatter profile formed since the *Maravillas* sank. Meanwhile, the primary cultural deposit has been ground down through anthropogenic agencies to the degraded state of a leveled ballast cluster associated mainly with hundreds of Spanish olive jar fragments and a heavily abraded section of keel. The *Maravillas*’s

Fig. 3. Ship’s lines of the *Maravillas* with behaviour/action levels highlighted. Photo: © Allen Exploration.

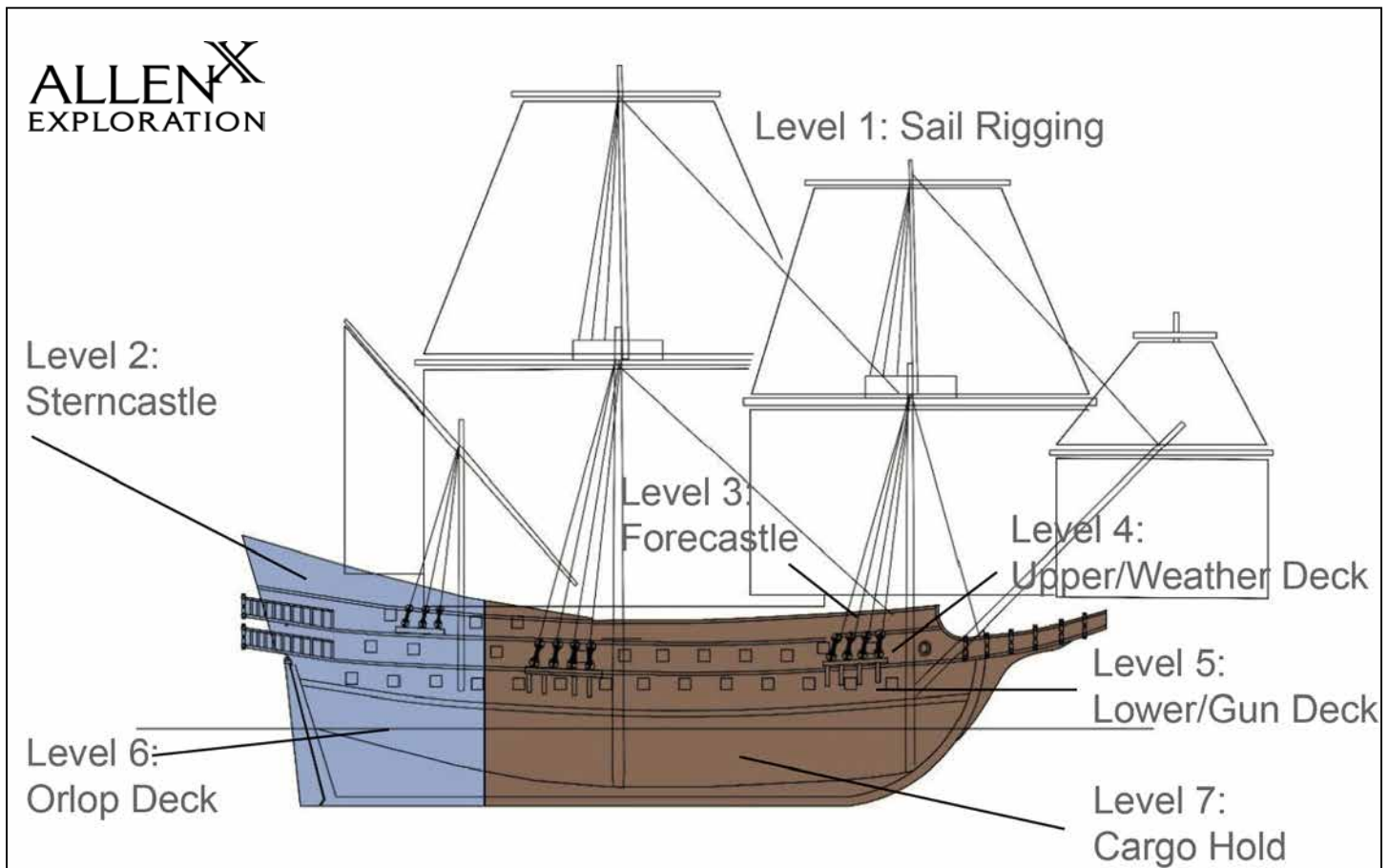


Table 1. A galleon matrix model formulated for the 1622 Spanish Tierra Firme fleet fleet & adapted by Allen Exploration for the study of the *Maravillas*.

ACTIVITY AREA	MATRIX ARTIFACT ASSEMBLAGE	BEHAVIOR PATTERNS
1.1 Standing Rigging	LEVEL 1 – SAIL RIGGING Mast, deadeyes, blocks, sheaves, line Yards, deadeyes, blocks, sheaves, line	Ship's design & construction science
1.2 Running Rigging		
2.1 Poop Deck	LEVEL 2 – STERNCASTLE Swivel guns, lanterns Swivel guns, whipstaff, tiller Navigational instruments, personal possessions, jewelry, bullion, coins, contraband, rapiers, daggers, eating utensils, glazed pottery, porcelain, religious objects	Elite lifestyles, smuggling, nautical science, personal adornment, fashions, anti-boarding defense, aristocratic value systems, religious beliefs, personal weapons (swords, daggers), grooming items
2.2 Quarter Deck		
2.3 Officers & Passengers Quarters		
3.1 Galley	LEVEL 3 – FORECASTLE Hearth & oven structure; cooking utensils Bower anchors, cable, figurehead Contraband, knives, bosun supplies, religious items	Food preparation, ground tackle, ship's supplies, smuggling, lower class lifestyles, religious beliefs
3.2 Beakhead		
3.3 Crew's Quarters		
4.1 Weather Deck	LEVEL 4 – WEATHER DECK Long boat, grapnel anchors, stream anchors	Ground tackle, deck cargo, ship's design & construction
5.1 Lower Decks	LEVEL 5 – LOWER DECK Cannon, gun carriages, artillery items, sidearm weaponry, crew's possessions	
6.1 Orlop Deck	LEVEL 6 – ORLOP DECK Ship's stores, ceramics storage, cables, sheet anchor, religious objects	Science, crafting skills, metalworking, coin trade
7.1 Cargo Hold	LEVEL 7 – CARGO HOLD Cargo: barrels, bullion lockup (silver & gold coins & bars), saleable ballast (copper bars), dunnage, cargo hooks; food & drink store; magazine (musketballs, cannon shot); structural equipment: rudder strap, pintles & gudgeons, sheet anchor, bilge pump, hatch covers	Shipboard armament, cargo storage, mercantile trade, food & water storage, ship's supplies, miscellaneous nautical equipment
7.2 Bilge	Hull Fittings: drift pins, nails, spikes, lead & copper sheathing; hull timbers; ballast (stone, gravel); bilge (shipboard refuse)	Ship design & construction, stone ballast composition & placement

current shipwreck articulation can be defined as caused by four natural and cultural depositional stages.

Stage 1. The Act of Wrecking (Pre-depositional Extracting Filter)

Negligence of running repairs and maintenance was not knowingly a factor underlying the loss of the *Maravillas*. Meticulous care was taken to maintain the ship's structural integrity. From preparations to sail from Seville, Don Matías de Orellana was charged with managing all carpentry and caulking work needed to strengthen the ship. Before leaving Andalusia, the galleon was careened and equipped "with all rigging needed from new fine yards from Flanders and canvas sails from Rennes." The *Maravillas* was supplied with customary replacement parts befitting a transatlantic voyage. De Orellana was further responsible for supervising in the ports of the Indies all repairs needed and examining the ship's sides and decks to ensure its safe return to Spain.¹¹



Fig. 4. A gold locket & 2-escudos gold coin from the *Maravillas*, minted in Santa Fe de Bogota, Colombia, dated '165-'. Photo: © Allen Exploration.

De Orellana was answerable for the galleon's ballasting and seaworthiness in Spain and the Indies. To guarantee the *Maravillas* was always stocked with adequate replacement parts, de Orellana was required to obtain a certification confirming what spares he sourced in Havana for the home crossing. The certification would then be checked in the bay of Cadiz.

Fig. 5. Gold finds from the *Maravillas*, including a chain and two pendants with gem inlays made for the Knights of the Order of Santiago. At right, silver coins & a silver bar. Photo: © Allen Exploration.



Should the documentation not meet royal standards, de Orellana's wages would be withheld. The galleon sailed with two carpenters, Bartolomé del Castillo and Mateo de Herrera, and two caulking foremen, Juan de Sevilla and Pedro de Ayllón.¹²

After the *Maravillas* left Havana for the home voyage on July 3, 1655, the ship did run into choppy and stormy conditions. Sailing through the Gulf of Florida, the storm worsened with the result that the galleon's "many braces and knees began to give up." However, the necessary repairs were attended to at Morro in Havana between October 10, 1655 and January 1, 1656. During the enforced winter stayover in Cuba, a new rudder and some hull parts that had given way were replaced.¹³

In the Straits of Florida, off the western Little Bahama Bank, the fleet *capitana* and the *Maravillas* were propelled into dangerously shallow waters at 11pm on the night of January 4.¹⁴ The *Maravillas* was the fleet's swiftest sailer thanks to its low prow and new sails with less canvas than the rest of the accompanying vessels. In danger of grounding, the galleon attempted to change tack and turn, but the strong currents and wind stopped it in its tracks. The *capitana*, sailing slightly ahead, succeeded in tacking and in the confusion rammed the *Maravillas's* beakhead and ran its bowsprit from the *Maravillas's* starboard to its port side. The *capitana's* cutwater had just been replaced in Havana with a mahogany one "as strong as iron." The *Maravillas* was crashed into with such force that its spare mast was broken in three and all the woodwork from the



Fig. 6. An emerald and amethysts from the scatter trail of the *Maravillas*. Photo: © Allen Exploration.

Fig. 7. An emerald & gold coss with wooden inlay from the *Maravillas*. Photo: © Allen Exploration.



highest section of one hold shattered, "splintering it all." The implication is that the *Maravillas* was sliced open at the waterline with such power that the hull above lost its structural integrity, partly collapsing and drifting away.

Seawater forcefully rushed into the hull, while the currents rapidly swept the vessel towards the shoals. The break in the hull was unfixable, so the *Maravillas* was left to run aground. The officers hoped to hang on until the hold could be bailed out in daylight and escape, but the storm had other plans and the galleon "started to touch and hit the rocks with such force that the hull split completely." Very large waves began to demolish the boarding hatches and tear the vessel to pieces. The *Mara-*

villas settled to starboard and increasingly more water poured in. Next, the three stern cabins, "forming a tower of wood," collapsed into the ocean. The galleon sank within 15 minutes of being rammed by the *capitana*.¹⁵ The foremast fell down at dawn. Some 605 of the 650 crew and passengers perished.

Whether, or to what extent, excessive weight played a part in the sinking remains an open question. The *Maravillas* transported not only its own official cargo but part of the consignments and illicit contraband from the *Jesus María de la Limpia Concepción*, *capitana* of the Armada del Mar del Sur, lost off Shanduy, Ecuador, in 1654.

During the pre-depositional stage 1 act of wrecking, rigging and sections of the upper deck would have broken away and drifted off before the *Maravillas* sank. While the

Salvors	Date	Site Status
Juan de Somovilla Tejada (40 divers)	June 1656	Hull in one piece: intact from keel to upper decks; poop & part of main deck separated from lower hull; jumbled piles timbers; lower hold & strong room inaccessible
Juan de Ochoa y Campo	May 1657	Starboard hatch immovable, covered by large ballast stones, jagged timbers & artillery; hull intact except at bow; stern closed in; forward, amidships & aft strong rooms tightly locked
Josef de Yriarte	Spring 1657	24 bronze cannon recovered
Juan de Somovilla Tejada	July 1657	Everything left of ship carried away by sea & currents; wreckage covered by sand after storm
de Somavilla Tejada and Gaspar de los Reyes	June 1658	Much of the ballast in the hull is “extracted”; 12 cannon recovered
Marcos de Luzio	1666	Many silver bars worked way into sand & settled below ballast
Martin de Melgar	March 1676	Site covered with marine growths of many colors; 5 cannon left underwater; much silver piled in hull; silver coins coral-encrusted; silverwares very worn & corroded
Captain Peres Savage & 5 English Salvors (80 divers)	March 1683	10 paths made by dragging stern to stern over 6 months

Table 2. Summary of the most impactful salvage expeditions to the wreck of the *Maravillas* from 1656-1683.

ship sank, and soon after the galleon was lost below the waves, major sections of structural hull remains, gun carriages separated from cannon (Fig. 8) and private property stored in the stern cabins spilled out of the galleon and began to scatter.

Stage 2. Organized Historical Salvage (Post-depositional Scrambling Device)

The wreck of the *Maravillas* was fished for treasures on at least 21 occasions between 1656 and 1683 (Table 2). Both successful and poor strikes characterized the salvage initiatives in these decades. Conditions at sea, and the progress of the breaking up of the cargo hold, were key to salvage productivity.¹⁶

Juan de Somovilla Tejada and Gaspar de Reyes recovered 477,146 *pesos*’ worth of treasure in 1656, including 300 large bars, 17 silver *piñas* cones, 100,000 pieces of eight, 405 *castellanos* of gold, a bronze cannon, more than 136 large and small silver plates, 15 candlesticks and jugs, extensive worked silverware, 18 silver spoons, 20 silver forks and carpentry tools. In the same year, Juan de Posadas Vergara brought up a mere 210 *pesos* of worked silver.

The largest single recovery haul was made in 1657 by Josef de Yriarte who landed hundreds of large and small silver and gold bars and 24 cannon, all valued at 1,500,000 *pesos*. A further 200,000 *pesos* of treasure were discovered by Martin de Melgar in 1678. Even

though Bermuda “wrackers” found an unproductive 1,000 *pesos* of valuables in 1681, New England sea captains were credited with hauling up 100,000 *pesos*’ of finds in 1683.

Treasure was readily accessible from the very start of the historical salvage endeavors when a box full of gold was spotted outside the hull in 1656.¹⁷ The cargo hold and its strong rooms remained locked and inaccessible that year. Into 1657 the large starboard hatch was described as immovable and covered by large ballast stones, jagged timbers and artillery. However, in light of the 1,500,000 *pesos* of treasure that Josef de Yriarte landed that year, and Juan de Somovilla Tejada and Gaspar de Reyes’ further haul of 170,000 *pesos* of wealth, it may be assumed that the hatch leading into the hold was ultimately forced open in 1657. By 1658, much of the remaining treasure was deeply buried under sand and by 1666 many silver bars had worked their way into the sediment and even settled below the ballast.

Turning to the structural remains, the hull of the *Maravillas* was already breached when it settled onto the seabed in January 1656. The three stern cabins had collapsed into the ocean, and Juan de Somovilla Tejada observed that the loof frame towards the stern and surrounding timbers from the quarterdeck were missing. Researchers have proposed this equates to quarter of the galleon at the stern. Underwater, Somovilla’s

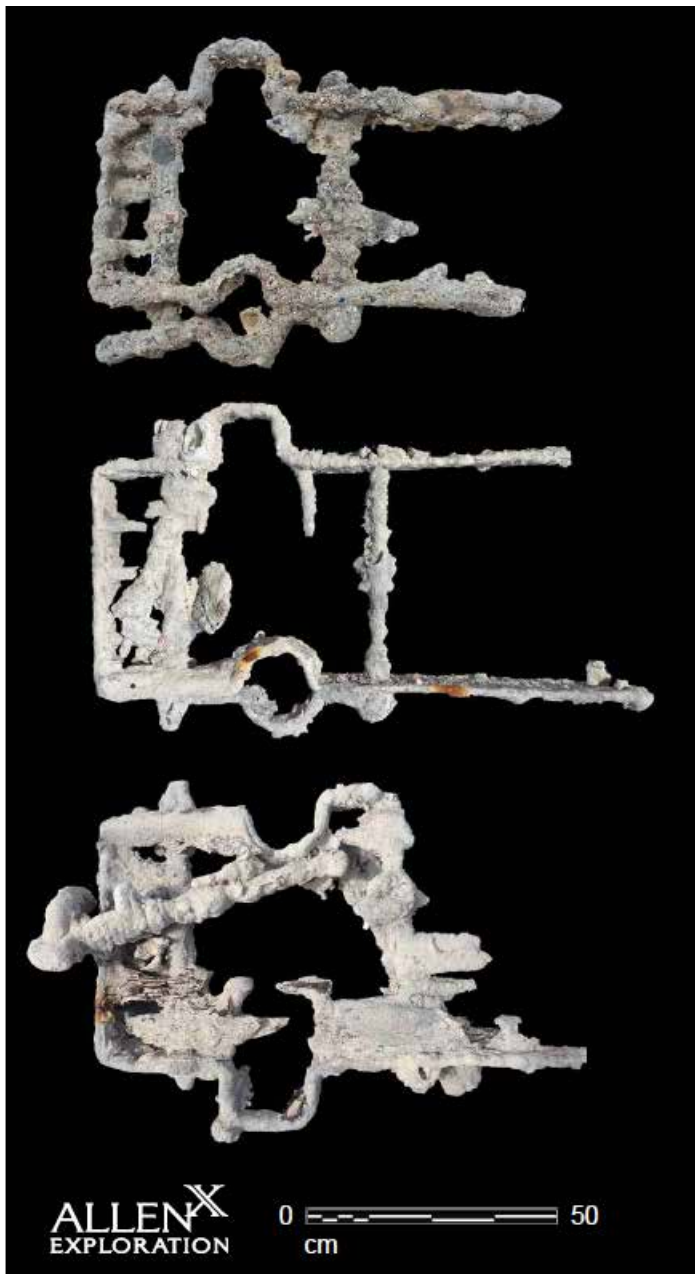


Fig. 8. Concreted iron brackets used to secure truck wheels to trunnions on the sides of the *Maravillas's* gun carriages. Photo: © Allen Exploration.

team were confronted by “a huge jumbled pile of rib timbers, frames and barraganetes [upper timbers].” Within six months of the ship’s sinking, therefore, it is clear that the upper hull had been destroyed. The lower hull, correlating at least to the height of the orlop deck, was still at least partially intact.

The *Maravillas's* lower hull remained largely intact into May 1657 when at least 41 guns were still scattered across the remains. The observation that the intact starboard hatch was covered by large ballast stones makes no sense given that it was stratigraphically elevated above the height of *Maravillas's* cargo hold.

One explanation is to identify the ballast as stones jettisoned by Somovilla’s salvage ship in June 1656 to make space for his abundant recoveries. Dropping ballast over a live salvage site, however, would have been counter-productive poor practice. Alternatively, had the keel broken in two, perhaps weakened after grounding on the reef and dislocating after the capitana’s cutwater raked the hold. In theory, a slumped section of keel and cargo hold could have been covered by collapsing ballast.

Seemingly in the spring of 1657, Joseph de Iriarte managed to clear access to the hold, which is implicit in the 24 guns he brought up and his success in tying lines and lifting dozens of silver bars and buckets filled with thousands of *pesos*. By the July of the same year, Somovilla noted that everything left of the ship had been carried away by the sea and currents. The wreckage was now covered by sand after a recent storm, suggesting the remains had been ground down to a level that sand could infiltrate the wreck to form a dynamic mound.

Heavy sand cover again compounded salvage attempts in 1658. Twelve more guns had been lifted by July 1658 and the surviving treasure was deeply buried. By 1666, silver bars freed of their contexts had worked their way into the sand and some settled below ballast. The hull’s interior coherency was abundantly scrambled. The wreck was so far disarticulated from the sense of a ship in 1676 that the remains confused Martin de Melgar. Much silver still remained on-site and the salvor’s statement that he “found the hull” suggests the lower ship was extensively ground down.

By this date the silver coins and silver utensils being salvaged were reported to be worn, corroded and coral-encrusted, confirming that the material culture had become exposed to the elements and was no longer sealed in an anaerobic environment. The wreck had taken the form of a marine oasis coated with “magnificent marine growths of many colors.” Coral was transforming the *Maravillas* from a galleon into an artificial reef after 20 years of submergence. Finally, in 1683 English and colonial salvors of the Americas dredged up part of the keelson. The hull was thus largely destroyed and broken into disarticulated sections.

The Stage 2 organized historical salvage witnessed extensive extracting filters that removed mass cultural material and structural remains from the wreck site. The wreckage, at first extensively exposed to the water column and then randomly revealed from within and below sediments, were relocated by scrambling devices, including salvors' dump and storms.

Stage 3. Systematic Modern Salvage (Post-depositional Extracting Filter)

The third trigger resulting in the extraction of mass material culture from of the *Maravillas* was heavy salvage by modern treasure hunters under Government of The Bahamas licenses. Robert Marx rediscovered the wreck in 1972 and used sediment removal equipment, which he called the "blaster", to expose wreckage 7.5 meters below a coral reef. In places the layer of ballast encountered was 1.5 meters deep. Marx referred to finding 10-15 tons of ballast in one area alone.¹⁸

Over six weeks his team from Seafinders, Inc., co-founded with Willard Bascom, recovered iron anchors, two 18-pounder, 11-foot bronze cannon

Fig. 9. Swords & sword grips from the wreck of the *Maravillas*. Photo: © Allen Exploration.

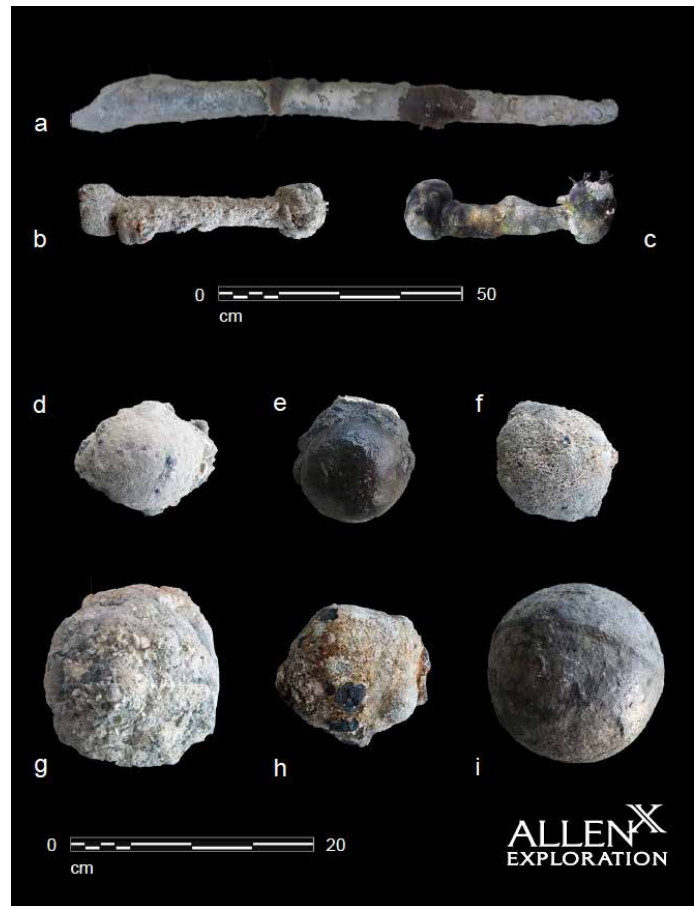
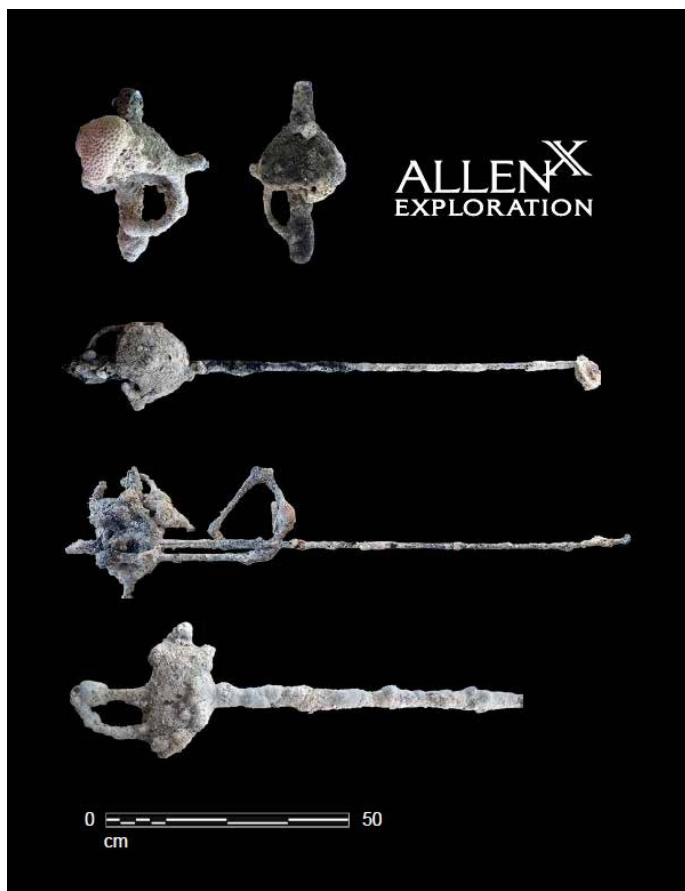


Fig. 10. Ordnance from the *Maravillas*: harquebus (a), bar shot (b-c) & cannonballs (d-i). Photo: © Allen Exploration.

bearing the crest of King Philip IV (r. 1621-1665), a gold scalloped dish, a 5-pound gold disc, gold coins from Bogota, over half a ton of silver bars, four plates, two cups, a pitcher, riding spurs, buttons, spoons, a fork, inkwell, snuff box (all silver), brass navigational dividers, a sealed jar containing wine, silver bars from Potosi, 4,600 silver coins in 8, 4 and 2-*reales* denominations minted in Lima, Potosi and Mexico City, five large clumps of coins in the shape of canvas bags weighing over 150 pounds, a brass apothecary's mortar and an intact sword.

Marx also described finding thousands of objects of copper, brass, pewter, lead, wood, ivory, bone, horn, ceramic, glass and stone. In just two days during his operations, more than three tons of coral-encrusted iron was recovered, mostly formed around ship's fittings and spikes, but also hammers, axes, chisels, keys, padlocks, swords, knives, cannonballs, kettles, pots, pans, serving ladles and a wooden cannon carriage. More exotic artifacts included emeralds, amethysts, a large ivory tusk, Chinese porcelain, a Mayan jade axehead, a three-legged stone food grinding *metate*,

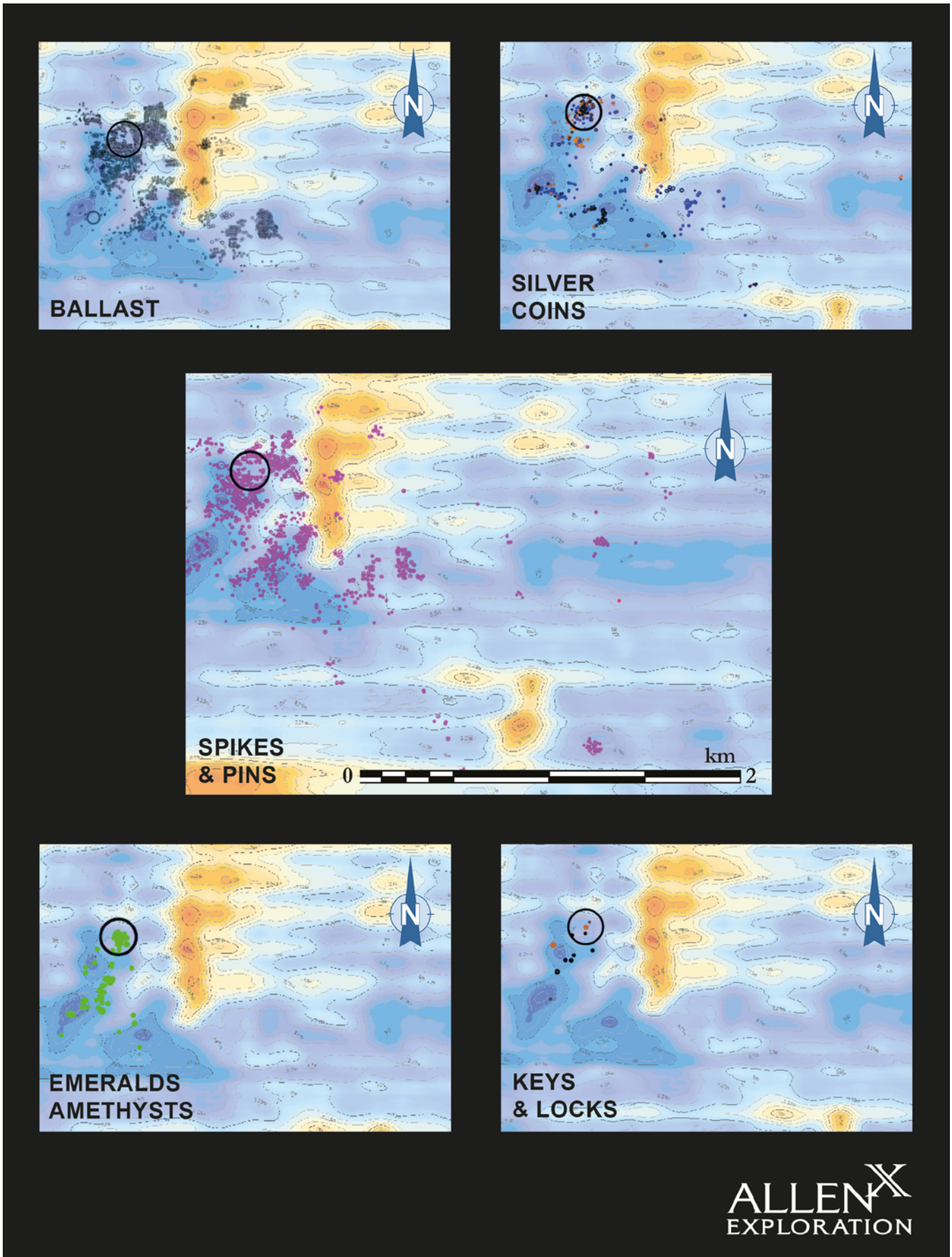
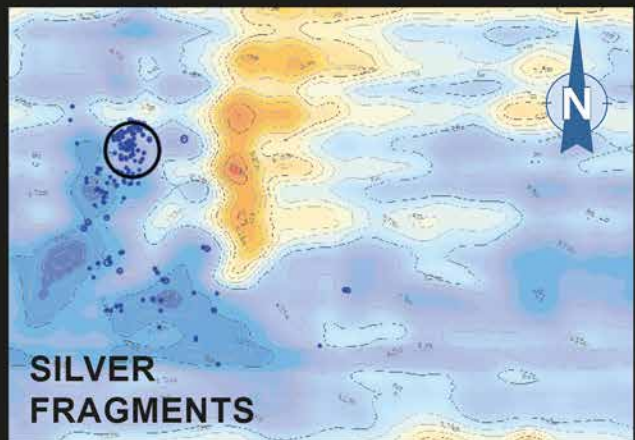
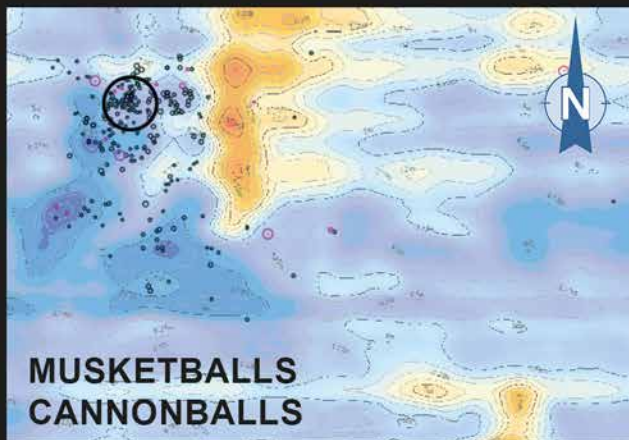
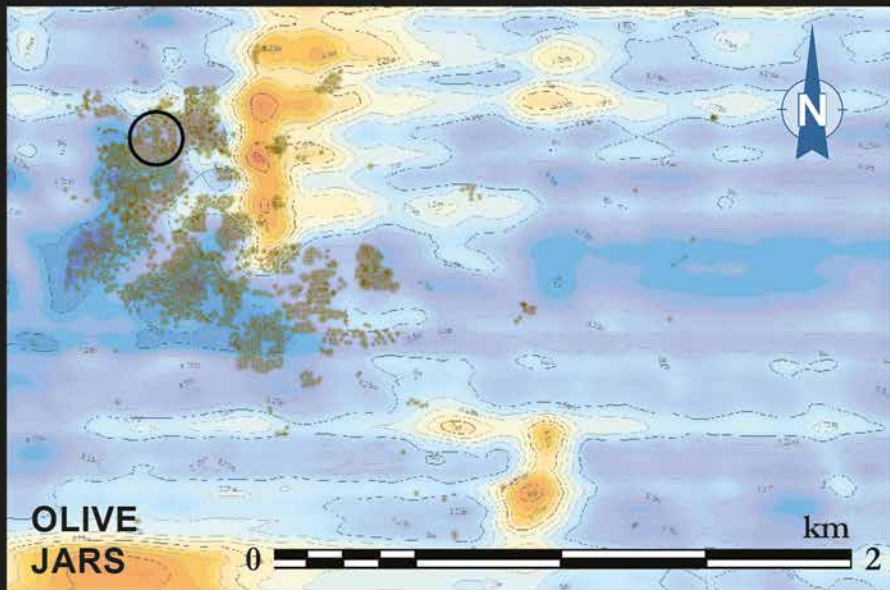


Fig. 11. Distribution maps of ballast, silver coins, hull spikes & pins, emeralds & amethysts, and keys & locks discovered along the *Maravillas* Artifact Scatter Trail. Photo: © Allen Exploration.



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Fig. 12. Distribution maps of olive jars, musketballs & cannonballs, & silver fragments discovered along the *Maravillas* Artifact Scatter Trail. Photo: © Allen Exploration.

human bones, fragments of cotton and wool clothing and what was bizarrely described as “Part of a human hair wig.”

Discoveries of caches of treasure led to days of “frenzy”. Marx believed he was working on the bow section of the wreck, whereas “the main bulk of the ship’s treasure was stored in the main hull which had broken away and was lying in another area.” In under six weeks between August 20 and October 6, 1972,

Seafinders, Inc. recovered an estimated more than \$2 million in treasure. Later in the project, 2 miles to the east, Marx claimed to have located what he identified as the “mother lode” of the *Maravillas*, at which point his permit was suspended and the project stopped.

The next extensive salvage operation began when Herbert Humphreys of Marex International once again discovered what remained of the *Maravillas* in June 1986 under 6 meters of sand. Humphreys

believed that the ‘motherlode’ and stern, which carried much of the galleon’s treasure, and that he valued at \$1.5 billion, remained undiscovered and untouched along a 8-16 kilometer trail extending southward from the wreck.

In 1987 Marex found a large iron anchor and a gold cross with six emerald inlays. 1988 brought the “summer of gold,” when a 4-pound silver bar, silver nuggets, gold jewelry in almost perfect condition, gold chains and a pendant from the Knights of the Order of Santiago were recovered.¹⁹ Other finds into 1991 included a bronze cannon, 27 gold bars of 91% purity, each weighing from 399-513 grams, 40 gold coins, a gold cross inlaid with 66 emeralds, a gold brooch inlaid with 80 emeralds, 25 silver bars and over 6,000 silver coins and emeralds.²⁰ Marex estimated their haul at more than 30 tons of finds.²¹

This modern salvage removed much of the residual artifacts associated with the *Maravillas*’s main ballast pile that the 17th-century salvors failed to lift. Both Marx and Humphreys were highly aware of the existence of scatters of cultural debris. Where Marx worked and what he recovered are unrecorded (or at least unpublished). Humphrey’s created a schematic map showing a scattered trail of remains extending some 2¾ miles southeast of the central site. The material found seemingly extended southeast for 1.2 miles before veering to the southwest.

Humphrey’s “Main Ballast and Artifact Pile” lay under turtle grass and consisted of two cannon, an anchor, swords, muskets, musketballs, silver coins, jewelry and emeralds. Timbers were detected around three-quarters of a mile away from the ballast, while silver bars continued for some 1.5 miles southwards, as did silver coins, keys, a silver candlestick holder, two silver candlestick snuffers and a miniature bronze cannon. Gold bars were located about three-quarters of a mile from the ballast pile, while silver plates clustered some 0.8-1.6 miles away. The cultural remains dropped off after approximately 1.6 miles. A southernmost deposit of silver coins and musketballs was uncovered around 2.7 miles from the ballast pile. Spikes and pins were common throughout the scatter trail. The veracity of Humphreys’ discoveries have been verified by AllenX’s magnetometer surveys and ground-truthing.

The Stage 3 systematic modern salvage extracted most of the extant cultural remains associated

with the main wreck site and removed an unquantified volume of finds from the scatter trail. Given the focus on detecting treasure in the 1970s to 1990s, it may be assumed that no high-status material inadvertently migrated into the Artifact Scatter Trail in this period. Broken wood, concretions broken open underwater (such as part of a silver bar concretion recovered by AllenX, for example) and their contents could have been washed onto the scatter trail.

Stage 4. Environmental Pressure (Post-depositional Scrambling Device)

In tandem with the anthropogenic filters that impacted the wreck of the *Maravillas* historically and in the modern era, in theory storms and hurricanes held a major capacity to disturb and scatter both surficial and buried cultural remains, contributing to the ongoing evolution of a sprawling Artifact Scatter Trail.

Daily currents and trade winds impacting the site of the *Maravillas* and its scatter trail mainly do not cause significant sediment movement, but storms and hurricanes do. The site – or perhaps what should today be referred to as the ‘sites’ of the *Maravillas* – lie along a Caribbean hurricane path. Storms played a significant role in regional ship losses. In The Bahamas Lost Ships Project database, historical sources reveal that storms accounted for 26% of historical losses in the 17th to 19th centuries centered on the western Little Bahama Bank and hurricanes another 18%.²²

The Bahamas has lived with extreme storms throughout history. Since 1850, ten tropical storms, 12 hurricanes and nine intense hurricanes have passed within a 50-kilometer radius of Thatchpoint Bluehole off the western Great Abaco island.²³ Since 1851, 45 storms have passed within 100 kilometers of the western Great Bahama Bank.²⁴ The Atlantic hurricane seasons of 2017 to 2019 caused \$330 billion in damages, accompanied by a death toll of over 3,000 people.²⁵ James Jenney of The Bahamas Lost Ships Project has registered 142 hurricanes and storms that struck the archipelago since 1500.

The western Little Bahama Bank lies within the Trade-wind Belt, and in the winter is exposed to winds blowing at an average velocity of 10-15 miles per hour. Northers, with wind velocities of 30-40 miles per hour, blow in from the northwest and northeast from November through April.²⁶ It is these cold fronts that

Fig. 13 (top right). Hull spike (a), sail rings (c), horse shoe (d) & tackle hooks (e-g) from the wreck of the *Maravillas*. Photo: © Allen Exploration.

are believed to have primarily caused the creation of the *Maravillas*'s Artifact Scatter Trail in the six months between the ship's sinking and the beginning of salvage operations.

Hurricanes strike the northern Bahamas every seven years on average.²⁷ Along the northern, open margin of St Croix, for example, in 1989 Hurricane Hugo stripped two million kilograms of sand from the Salt River Submarine Canyon, the equivalent of a century of fair-weather conditions.²⁸ Fine-grained, shallow-water carbonate sediments can be transported at least 120 kilometers from open-ocean bank margins.²⁹ During storms, AllenX has observed lobster traps anchored with 15-18 kilogram concrete slabs moving 3.0-4.5 kilometers.³⁰

Such extreme activity has obvious impact influences on both ship and wreck deterioration. Small and lightweight finds, such as potsherds, coins, emeralds, amethysts, jewelry, ship's nails and fitting, are readily transportable during storms. The distribution of silver bars, anchors, iron cannon carriage strops and lead musketballs are almost certain to have remained static in relation to their loss contexts – unless transported on floating hull remains before the structural elements became saturated with seawater soon after the sinking of the *Maravillas*.

4. Scattered Survival: Reading the *Maravillas*'s Debris Field

Irrespective of the scrambling devices that underlie the dispersal of the material culture of the *Maravillas* over 367 years— salvage, nature or both – Allen Exploration's geophysical analysis, ground-truthed through systematic dives, for the first time allows the scattered nature of the wrecked galleon to be articulated archaeologically. Every artifact identified underwater since 2020 has been identified in a proprietary database developed for AllenX. The finds cover the whole spectrum of behavioral action on the galleon from rigging elements, navigational

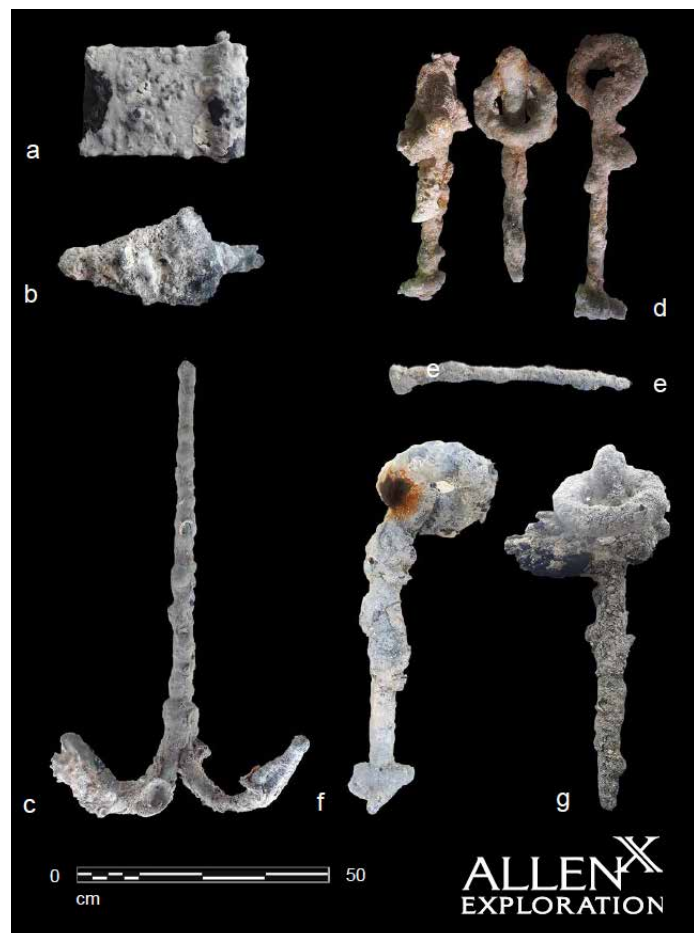
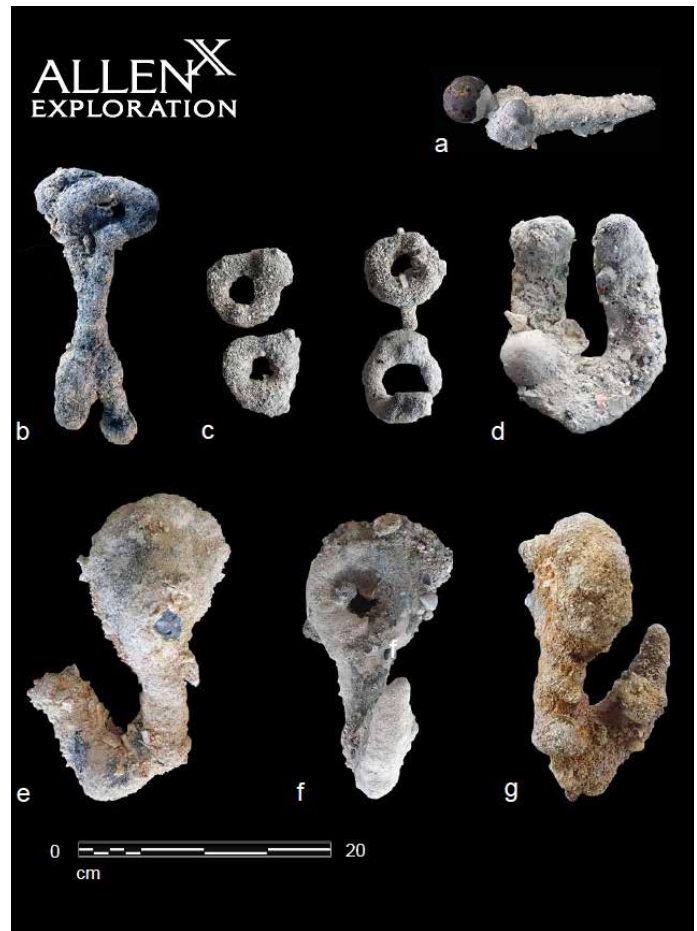


Fig. 14 (bottom right). A padlock (a), anchor palm (b), salvors' grapnel anchor (c), rigging (d) and hull spikes (e-g) from the wreck of the *Maravillas*. Photo: © Allen Exploration.



Fig. 15. Concreted iron chest keys from the wreck of the *Maravillas*. Photo: © Allen Exploration.

equipment, guns, shot and personal armament to bullion and coin cargo, the ceramic tablewares used during meals, private belongings (including high-status gold and silver objects), all the way down to the ballast from the hold and iron hull fittings (Table 4).

The current study examines eight categories of finds to assess the scattering effect through their distributions:

- Sail Rings & Tackle
- Iron Chest Keys
- Silverware Fragments
- Emeralds & Amethysts
- Olive Jars (Complete, Neck Fragments & Sherds)
- King Phillip IV Silver Coins
- Lead Musketballs & Cannonballs
- Iron Hull Spikes
- Stone Ballast

Rigging varies from rings used to fix sails in place to straps for backstays,³¹ hooks for deck stoppers and

general use in jiggers, runners and tackles for staying the lower masts (Figs. 13b, e-g).³² These elements of the *Maravillas* have been identified scattered up to 1.8 kilometers south of the main wreck site and 2.3 kilometers east/west (Fig. 11).

Even though the wooden chests that once secured personal belongings and wealth have long vanished – salvaged and discarded after their contents were cleaned out or deteriorated in the northern Bahamas’s severe marine environment – 14 iron keys that once locked padlocks have been traced across an area 1.4 kilometers north/south and 1.1 kilometers east/west of the *Maravillas* scatter trail (Figs. 11, 15). They serve as proxy evidence for the general extent of scattering of the galleon’s private property that their chests once contained.

Whereas golden pendants with emerald and precious gem inlays, related to the Knights of the Order of Santiago (Fig. 5), and other goldwork (Figs. 4, 5, 7), are excellently preserved off the Little Bahama Bank, the silverware is heavily deteriorated, apart

Fig. 16. Silver from the wreck of the *Maravillas* (a. ingot, b. fork, c. knife handle, d-f, h. candlestick sections, i. spoon sections). Photo: © Allen Exploration.



from ingots (Figs. 16a, 17d). The 100 fragments discovered by Allen X range from parts of candlesticks to plate rims, spoons (18) and forks (2) (Figs. 16-17). The character of much of the silverware vessels can no longer be reconstructed. The assemblage runs 1.6 kilometers north/south and 1.8 kilometers east/west (Fig. 12) and reflects the amplitude of scattering of personal belongings most probably stored in the great cabin and officers' and passengers' cabins on the upper gun deck.

The silverware seemingly was stored in at least two different spaces. Some was undoubtedly the personal belongings of officers and passengers held in their cabins. Others were consignments being dispatched to Spain. The official silver entered on the ship's manifest was not stored above deck but was tightly secured in the cargo hold under hatches in the lower deck, according to testimony handed down by the salvor Gaspar de los Reyes.³³ There, the bullion and coins were stored in "rooms for the silver... in wooden boxes like the ones in which worked silverware is normally delivered." The silver

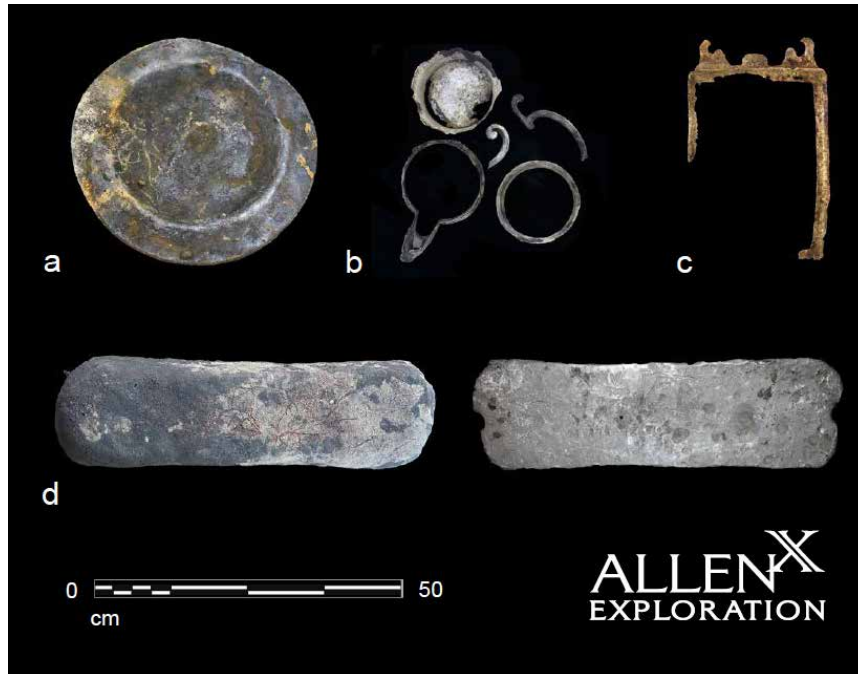
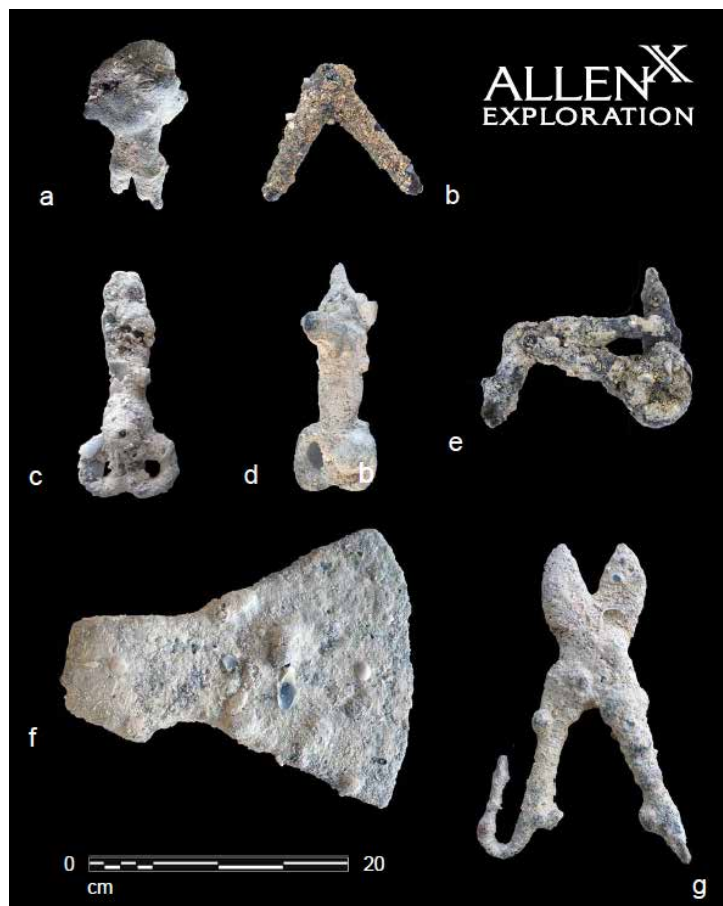


Fig. 17. Silver from the wreck of the *Maravillas* (a. plate, b. flask fragments, c. painting frame, d. ingot. Photo: © Allen Exploration.

silver was largely salvaged by Spanish expeditions between 1656 and 1676, with more recovered by

Fig. 18. Navigational dividers (a, b, e), scissors (c, d, g) & axe head (f) from the wreck of the *Maravillas*. Photo: © Allen Exploration.



room door was fitted with two locks. One key was closely protected in the waist pouch of Diego de Yuste, the *Maravillas*'s silversmith, and the other guarded by the Marques de Montealegre, Captain-General of the Tierra Firme fleet in 1654. The silver room also held 12 wooden boxes filled with worked silverware.

Much of the official manifested

silver was largely salvaged by Spanish expeditions between 1656 and 1676, with more recovered by Marx and Humphreys in the modern era. The silverware recorded by AllenX since 2019 is believed to have derived from the stern cabins of the upper vessel, where it was stored as the personal wealth and property of passengers and merchants and was scattered away from the *Maravillas* when the galleon started to sink and in subsequent months.

The sample of 103 emeralds and 22 amethysts identified by AllenX across an area of 0.7 kilometers north/south and 0.4 kilometers east/west are important trace elements reflecting the immense scale of smuggling Spanish galleons like



Figs. 19-20 (above left & right). Olive jars from the wreck of the *Maravillas*. Photo: © Allen Exploration.

the *Maravillas* pursued (Figs. 6, 7, 11, 26). Neither form of gem was specified in the official cargo manifests. Concealing emeralds mined in Colombia as contraband was a mania that was prevalent as early as 1555, when an investigation into the sinking of the 350-ton *Santa Cruz* near Tarifa in Spain discovered that Sancho de Clavijo, the former Governor of Tierra Firme, lost large quantities of emeralds and pearls in the tragedy.³⁴

The endemic smuggling of emeralds as contraband was first recognized archaeologically on the wrecks of the *Atocha* and *Margarita*, lost off the Florida Keys in 1622. Over 400 emeralds were recorded near the *Atocha*'s main ballast pile – and over 2,300 in total from the scattered wreck³⁵ – but, notably, no amethysts, which seem to be unique to the *Maravillas*. Smuggling continued over three decades later on the *Maravillas*.



Both Marx and Humphreys recovered an unknown quantity of large emeralds and amethysts from the wreck's central ballast area in the 1970s to 1990s (the latter located a 100-carat amethyst).

Fig. 21. Lead muskeballs from the wreck of the *Maravillas*. Photo: © Allen Exploration.



Fig. 22 (right). Obverse & reverse of an extremely rare Potosi mint shield design coin issued under the assayer Ergueta in 1652; from the *Maravillas* wreck. Photo: © Allen Exploration.

The emeralds originated in the rich reserves found at Somondoco and Muzo in Colombia,³⁶ and were cherished as symbols of chastity for inlays in Spanish crosses, rosaries, pendants and other forms of jewelry.³⁷ The source of the *Maravillas*'s gems is currently under examination.

Although historical sources leave no doubt that emeralds were still exported from the port of Cartagena in 1735,³⁸ no emeralds or amethysts were recorded on the wreck of a Spanish fleet ship lost off Vero Beach, Florida, in 1715 or among the remains of the *Nuestra Señora de Begoña* Spanish merchant vessel sailing from Caracas to Tenerife when it was lost off La Caleta de Caucedo in the Dominican Republic in 1725.³⁹ Since no gems were registered on the official manifest of the *Maravillas*, just how many emeralds and amethysts were smuggled is anyone's guess. Marex Int. claimed to have seen emeralds everywhere and that the galleon was transporting a ton of the gems,⁴⁰ a theory that is purely speculative. The reality could have been more or less.



The *Maravillas*'s hundreds of *botijas*, 'olive' jars seemingly from the orlop deck, where they were used to store general foodstuffs from wine, olive oil and vinegar to olives, almonds, hazelnuts, raisins, honey, liquor, capers and rice, and even butter, sweet wine, salted meat, pickles and gunpowder,⁴¹ are today predominantly shattered (Figs. 19-20). Spanish galleons carried large amounts of these storage jars, at least since an armada invaded England in 1588 and ended up lost off Ireland.⁴² A collection of 209 *botijas* was recovered from the coherent wreck of the 107-ton merchantman sailing with the 1662 fleet, lost in deep waters in the Straits of Florida and identified as the *Buen Jesús y Nuestra Señora del Rosario*.⁴³ Decades later, the *Conde de Tolosa* and *Nuestra Señora de Guadalupe* carried at least 540 and 297 olive jars respectfully when they succumbed to a hurricane off the Dominican republic in 1724.⁴⁴

AllenX has recorded off the western Little Bahama Bank two intact jars, as well as 55 rims and necks and 13 bases, alongside 10,920 body sherds. For reasons of pragmatism and their limited significance, the expedition does not recover all potsherds. The *Maravillas*'s *botijas* are scattered over a distance of 2.0 kilometers north/south and 2.2 kilometers east/west

Figs. 23-25. *Maravillas* shipwreck coins. Left: a Potosi mint die of 1652 with the ordinal of King Phillip IV & 'D.G.' (standing for *Dei Gratia*, By the Grace of God); center: rare Santa Fe de Bogota mint issue with assayer initials sequence of PoRAMS for Pedro Ramos, 1651, & PLVS VLTRA, "MORE BEYOND", between pillars & waves; right: Mexico City mint of c. 1655 with 'oM' mintmark, 'P' assayer initial & '8' for 8 reales. Photo: © Allen Exploration.



Cultural Remains	Volume	Spatial Origins	Ship Level	Scatter Dimensions (NS to E/W in km)
Sail Rings & Blocks	< 20	Running & Standing Rigging	Level 1.1-1.2	1.8 x 2.3
Iron Chest Keys	14 keys	Sterncastle	Level 2.3b	1.4 x 1.1
Silverware Fragments	100	Sterncastle	Level 2.3b, Level 2.3d	1.6 x 1.8
Emeralds & Amethysts	103 22	Forecastle	Level 3.3	0.7 x 0.4
Olive Jars	10,990	Orlop Deck	Level 6.1a	2.0 x 2.2
King Phillip IV Silver Coins	2,988	Sterncastle Cargo Hold	Level 2.3 Level 7.1a	5.0 x 2.1
Lead Musketballs	828	Cargo Hold	Level 7.1c	1.1 x 2.1
Iron Spikes	3,046	Cargo Hold	Level 7.1e	5.4 x 2.3
Stone Ballast	14,050	Cargo Hold	Level 7.1g	1.9 x 2.2

Table 3. Summary of key assemblages from the wreck of the *Maravillas*, their artifact scatter areas, & origins according to the galleon matrix.

(Fig. 12). Based on the evidence from the *Tolosa* and *Guadalupe*, they may have been stowed originally on dunnage of straw or plant matter with hemp lines securing them in place.⁴⁵

The *Maravillas* officially transported between 80,892 and 82,220 silver pieces of eight,⁴⁶ although an unknown volume – believed to be enormous – was also shipped as contraband. To date, AllenX has recorded a trail of 2,988 coins running 5.0 kilometers north/south and 2.1 kilometers east/west (Fig. 11). All coins that have been successfully conserved have proven to be issues minted under King Phillip IV (Figs. 22-25), who reigned in the year when the *Maravillas* was lost.

A total of 828 lead musketballs, perhaps part of the artillery stowed en masse in the magazine within the hold, is scattered along the southern debris field for a distance of 1.1 kilometers north/south and 2.1 kilometers at their widest point (Figs. 12, 21). Royal Spanish regulations required ships of 120, 200 and 250-320 tons to sail respectively up to 1573, and seemingly into the 17th century, with 12, 20 and 30 harquebuses for defense alongside its cannon. Lead shot found scattered across the wreck of the *Santa Clara*, lost south of the *Maravillas* in the northern Bahamas, were to be used as scatter shot pellets in tube guns, *versos* and on shoulder-mounted harquebuses. The latter could fire a distance of 200-600 paces.⁴⁷ The *Maravillas*'s shot room was located amidships.⁴⁸ The wreck's cannonballs, by contrast (Fig. 10), are only scattered over a distance of 0.6 x 1.7 kilometers.

Iron spikes that once bolted and nailed the *Maravillas*'s hull together are common along the debris field: 3,046 have been identified, many present in clusters of up to 78 examples per location within a diameter of some 13 meters (Figs. 13a, 14e-g). The light spikes are distributed across an area of 5.4 kilometers north/south and 2.3 kilometers east/west. (Fig. 11) They originated from various parts of the hull and would have been used to secure the keelson to the keel and nail frames and stringers to ceiling planks and strakes. Plotting their locations provides a robust index of the hull's geospatial scattering.

Amorphous stone ballast, once carefully stowed above the keelson in the cargo hold to trim the *Maravillas*'s buoyancy, in theory might be expected to have witnessed limited relocation due to the blocks' weight. Individual blocks weigh approximately 1.8 kilograms on average. Captain Ochoa's salvors described the ballast as "very heavy, making it difficult to move," so that the work required "divers of great physical strength."⁴⁹ An extensive spread of dispersed ballast, associated with hundreds of broken olive jar sherds, remains the only conspicuous attribute of the once coherent hull. However, the 14,050 ballast stones identified along the scatter trail as originating from the *Maravillas* display a surprisingly extensive scatter profile. At their broadest parameters, examples extend 1.9 kilometers north/south and 2.2 kilometers east/west (Fig. 11).

Table 4. A galleon matrix comparing materials discovered by AllenX with their original structural spaces on the *Marrullia*.

ACTIVITY AREA	MATRIX ARTIFACT ASSEMBLAGE	ALLENX FINDS
LEVEL 1 – SAIL RIGGING	1.1 Standing Rigging	Mast, deadeyes, blocks, sheaves, lines
	1.2 Running Rigging	Yards, deadeyes, blocks, sheaves, lines
LEVEL 2 – STERNCASTLE		
2.1 Poop Deck	Swivel guns, lanterns	
2.2 Quarter Deck	Swivel guns, whipstaff, tiller	Swivel guns (2)
2.3 Officers & Passengers Quarters	Navigational instruments, personal possessions, jewelry, bullion, coins, contraband, rapiers, daggers, eating utensils, glazed pottery, porcelain, religious objects	Navigation: astrolabe wing nut, dividers (4, iron); dividers (1 bronze); Personal: Knights of Santiago pendants, ring, chains, clothing studs (all gold); candlesticks & tray, ornaments, painting frame (all silver), scissors, garning piece (lead) + padlock, keys, strap? (iron) from travel chests; Specie & bullion: gold & silver coins, silver ingots; Defence: sword parts (11); Dining utensils: spoons, fork, pitcher, bowl, plate & fragments, platter fragments (all silver), Chinese porcelain, majolica, case bottle (glass); Contraband: emeralds, amethysts; Religious: gold & wood crucifix
LEVEL 3 – FORECASTLE		
3.1 Galley	Hearth & oven brick structure; cooking utensils	Hearth brick fragments (2)
3.2 Beakhead	Bower anchors, cable, figurehead	
3.3 Crew's Quarters	Contraband, knives, bosun supplies, religious items	
LEVEL 4 – WEATHER DECK		
4.1 Weather Deck	Long boat, grapple anchors, stream anchors	
LEVEL 5 – LOWER DECK		
5.1 Lower Deck	Cannon, gun carriages, artillery items, sidearm weaponry, crew's possessions	Arquebuses (3), barshot; spoon, plate (pewter), knife handles (bone); fishing net weights (lead), fishing net fid
LEVEL 6 – ORLOP DECK		
6.1 Orlop Deck	Ship's stores, ceramics' storage, cables, sheet anchor, religious objects	Olive jars, glass bottle stoppers (pewter)
LEVEL 7 – CARGO HOLD		
7.1 Cargo Hold	Cargo: barrels, bullion lockup (silver & gold coins & bars), saleable ballast (copper bars), dunnage, cargo hooks; food & drink store; magazine (musketsballs, cannon shot); structural equipment: rudder strap, pintles & gudgeons, sheet anchor, bilge pump, hatch covers	Barrel hoops (2), silver bars (2) & coins; musketballs, barshot, cannonballs
7.2 Bilge	Hull Fittings: drift pins, nails, spikes, lead & copper sheathing; hull timbers; ballast (stone, gravel); bilge (shipboard refuse)	Iron pins, nails, spikes, lead & copper sheathing; stone ballast

Scatter No.	Development Date	Salvage Criteria	Maravillas Ship Level Impacts
Artifact Scatter Trail 1	January 1656	Upper woodwork shatters & splinters; hull splits completely; 3 stern cabins collapse; piles of jumbled wood & broken boards; poop & main deck lost	Levels 1-4
Artifact Scatter Trail 2	Summer 1657	Removal 24 guns; hull extensively carried away by waves & currents	Levels 2-4
Artifact Scatter Trail 3	June 1658	Removal 12 guns; ballast extracted	Levels 5-7
Artifact Scatter Trail 4	1683	Ten paths dredged through the wreck; parts of keelson recovered	Level 7

Table 5. Potential reconstruction of how the *Maravillas* was impacted and its scatter trail formed.

6. Conclusion: Unscrambling the Matrix

AllenX’s surveys since 2019 have documented a complex Artifact Scatter Trail off the western Little Bahama Bank. The remains run from the original point near where the *Maravillas* struck a reef on the fateful evening of January 4, 1656, largely in a southeasterly direction for a total distance of at least 3.4 kilometers north/south and 2.04 kilometers east/west.

The *Maravillas* scatter trail displays neither archaeological stratigraphy, nor contextual preservation. There are no *in situ* remains. The shipwrecked galleon’s material culture identified to date takes the form of isolated archaeological artifacts. The mighty hull structure has been virtually eradicated: only 63 timbers, 1.5-3 meters long maximum and heavily abraded, were identified in the study zone. However, the *Maravillas* has not been salvaged into oblivion; significant archaeological remains survive. Not only have intrinsically significant artifacts beaten the odds, so have assemblages of material of technological, socio-economic and religious significance.

The *Maravillas*’s scatter trail assemblages can be traced back to six of the seven levels of behavioral activity that once flourished on the bustling ship (Table 4). Concreted rigging is not infrequent (Sail Rigging, Level

1). Two swivel guns (Sterncastle, Level 2.1-2.2) were once installed in the poop or quarter deck to fire on attackers trying to board the ship or rake enemy ships at close range. Personal belongings and contraband from the officers’ and passengers’ quarters are especially common (Sterncastle, Level 2.3). They range from navigational equipment and the Chinese porcelain and majolica from Seville and Pueblo in Mexico that officers and passengers ate off with silver forks to gold and gem-inlaid jewelry, chest keys, swords and smuggled emeralds and amethysts.

These scattered materials were once carefully arranged in wooden crates and boxes whose packaging has entirely decomposed. Only their concreted iron keys survive (Fig. 15).

Fig. 26. Carl Allen examines an amethyst recovered from the wreck of the *Maravillas*. Photo: © Allen Exploration.



Various witnesses described in the later 1650s the original contents of a cross-section of these containers after being salvaged from the sea. The carpenter from Somovilla’s first salvage, Antonio Carave, saw in opened boxes two or three gold chains, doubloons, diamonds, silverware and, in another box, small silver bars of about 3 pounds each, three or four rings with diamonds, 120 gold doubloons and 1,500 silver coins, among other items.⁵⁰ More boxes were filled with a cross, two painted images, many images of Our Lady of Copacabana, another large representation of Nuestra Señora de la Concepción (the Virgin

Mary), objects embedded with stones, a small gold pot, ceramics, many silver ‘shoes’,⁵¹ curious animal bones believed to cure sickness and treat poison, much jewelry, as well as smaller boxes containing golden items.⁵²

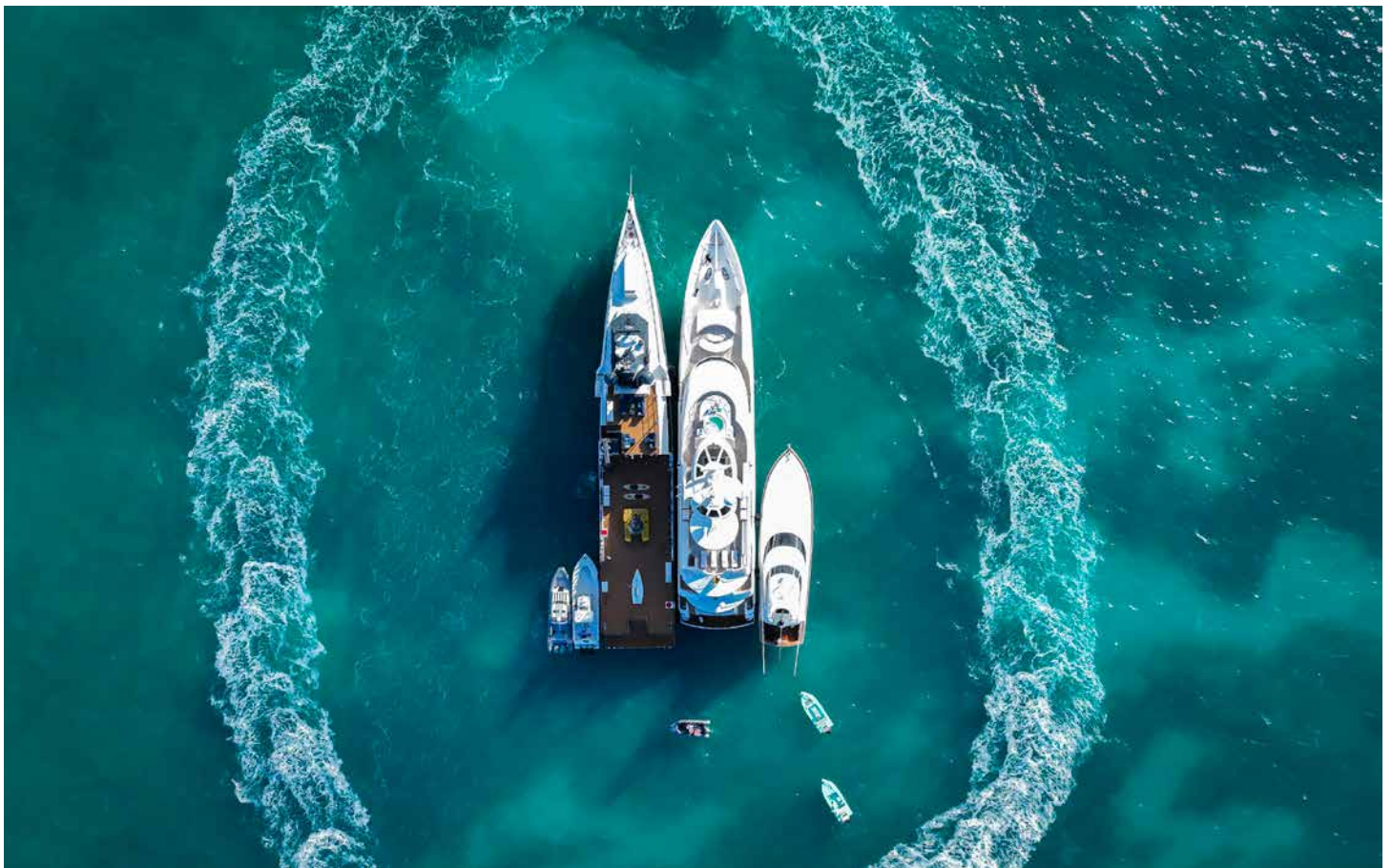
Similarly, witness Antonio Sarobe claimed to have having salvaged a large number of bars, colonial silver bullion, *reales* of 8 doubloons, diamonds and worked silverware. He recalled opening nine boxes, one of which held two small gold chains and two small bars of about 3 pounds per ingot, four rings with five to six diamonds in each and 120 doubloons. Another box held 14,000 pieces of eight, two bars, and 11 silver plates. Yet another box stored cacao, clothing, musk, amber and carpenter’s tools.⁵³ A further crate contained 22 gold bars, 13 gold coins and a *venera* (insignia) from the Order of Santiago,⁵⁴ which is of particular relevance in light of the multiple pendants of this military order discovered by AllenX. Many of the boxes were richly endowed with small pouches of up to 70 doubloons, spoons and gold plates, gold disks, small gold bars and

jewels.⁵⁵ These accounts offer colorful insights into the historical matrices where the isolated artifacts recovered by AllenX originated among the private baggage of traveling passengers and merchants.

The forecastle (Level 3) is seemingly very lightly represented, although perhaps additional smuggled emeralds and amethysts originated there, while the grapnel and stream anchors from the weather deck (Level 4) were largely extracted by former salvage operations. A range of ordnance and crew’s possessions used on the lower deck survives (Level 5), as well as olive jars and the durable pewter stoppers from glass bottles once found on the orlop deck (Level 6). Finally, a low level of silver bars, iron barrel hoops, alongside significant clusters of Spanish silver coins, muketballs, barshot, cannonballs, and stone ballast once filled every nook and cranny in the cargo hold (Level 7.1). Spikes and fitting that once inter-connected the lower hull are relatively common discoveries (Table 7.2).

Precisely how the *Maravillas* broke apart and ended up so heavily scattered cannot be reduced to a mathematical equation. The impacts were too numerous,

Fig. 27. AllenX’s research fleet: dive boats next to the 55.3-meter *Axis* support ship, the 49.7-meter *Gigi* and the *Frigate*. Photo: © Allen Exploration.



long-lived and inadequately understood. And the nature of the environment in the second half of the 17th century is a major unknown. Today, deep sands most commonly cover the Artifact Scatter Trail. The environment has altered drastically since salvors in 1972 described enjoying incredible colorful reefs and clusters of ingots sitting virtually exposed on the seabed. Today, the majority of *Maravillas* cultural remains are buried under 2.5 meters on average and a maximum amplitude of 7.5 meters. Three meters more sand seemingly covers the hardpan of the seabed and the *Maravillas*'s scattered wreckage than in the 1970s. The reefs have all sadly been choked with sand and are dead.

The reality of 1656-1683, and subsequent centuries, and to what extent conditions have remained relatively stable or dynamically changeable, is impossible to appraise, but is a key factor in determining how artifacts settled in one spot or continuously churned and migrated southwards through ever-shifting sediments. Certainly, Gaspar de los Reyes Palacios, Second Pilot of the *Maravillas*, was aware after the sinking in April 1656 that dynamic sediment movement was a worry, and warned that "It is necessary to act quickly before the sea covers the treasure with sand in a short period of time."⁵⁶ Historical salvage reports prove this is exactly what happened.

In the development of the *Maravillas*'s debris field, at least four broad phases may be proposed to have been especially instrumental (Table 5). A Scatter Trail 1 began to form as soon as the galleon foundered. The historical sources confirm that the upper hull began to break up immediately in January 1656 when the woodwork from the highest hold was shattered and splintered. In the same year, wooden chests containing the private belongings of passengers, merchants and officers started dispersing to the sides of the hull. The discovery by AllenX 1.7 kilometers east of the main wreck site of heavy iron brackets that once secured bronze cannon to wooden gun carriages (Fig. 8), points to guns having broken free of their restraints at the time of sinking, leaving their wooden carriages and associated sections of decking to float away. The huge jumbled pile of planks, frames and upper timbers began to scatter to the rhythm of current and wave power.

The majority of cultural remains that make up

the *Maravillas*'s Artifact Scatter Trail are believed to have been dispersed in this phase by winds and waves propelled by two to three back-to-back northerly and northeasterly cold fronts. AllenX's discoveries include finds of high financial value (gold and gem-inlaid pendants, gold chains, silver bars, silver coins). There can be no doubt that if they were identified *in situ* within the hull by Spanish salvage teams, they would have been recovered. The same holds true for Marx and Humphreys' extensive re-salvage of the main wreck site. The survival of these elite possessions into the modern era strongly suggests they had already dispersed within the six months prior to the commencement of salvage operations and were not present to be extracted by former salvage expeditions, whether historical or modern. Scatter Trail 1 is believed to have contributed the bulk of finds dispersed south and southeast of the wreck.

By the mid-summer of 1657, the cargo hold had seemingly been broken into after 24 overlying bronze guns were salvaged. Now, the structural integrity of the hold was no longer intact, leaving its spaces to be swept by currents and wave surge after the removal of treasure and raking aside of timbers and cultural remains. With the heavy hull elements and cannon no longer *in situ*, underlying wreckage was free to be dispersed by natural and anthropogenic impacts, forming Scatter Trail 2 as storms swept the site.

The process of site scrambling continued to accelerate in June 1658 when another 12 bronze guns were salvaged, contributing to the evolution of scatter Trail 3. At this date, and into 1677, the wreck formed an archaeologically recognizable mound capped with coral growth. A significant Scatter Trail 4 would have begun to form in 1683 when ten paths were dredged through the wreck of the *Maravillas* to such an extent that sections of the keelson were ripped up. Each time structural remains, ship's stores, private possessions and cargo were removed, loose material would have been susceptible to being washed away.

Considering the large scale of the historical salvage focused on the *Maravillas* up to 1683, the destructive methods applied and the need to break up the hull to access the hold, it seems unlikely that

the modern salvage initiatives of Bob Marx and Herbert Humphrey's contributed in any major way to further scatter trails, even using prop wash deflectors. The wreck's impacts were already long in play.

The unqualifiable 'x factors' in the timeframe and processual formation of the Artifact Scatter Trail are the durations and severity of storms and to what extent the region's deep sand dunes shifted, merged, eroded and re-formed. Hurricanes of course could shift whole banks of sand in short periods of time. However, if the *Maravillas*'s scattered artifacts were caused by such weather bombs, the distribution of finds would be expected to be far more chaotic and extensively deposited around all points of the compass.

Juxtaposed alongside the cross-section of scattered artifacts south of the *Maravillas* wreck site is the enigma of material culture missing in action. Such a galleon should have carried a large stock of wooden barrels and kegs in the hold (Level 7), from which abundant iron hoops would be expected to be preserved archaeologically. They are almost entirely absent. Evidence of essential everyday cooking is almost unrepresented, including the hundreds of red bricks from the cooking galley's two stoves (Level 3).⁵⁷ Just two brick fragments have been detected to date. Where are the heavyweight iron gun carriages straps associated with the rest of the 36 cannon that the *Maravillas* carried? To date, just three have been discovered by AllenX.

Substantial archaeology awaits detection off the western Little Bahama Bank. Just how much is impossible to gauge. The scale of the contraband smuggled on the *Maravillas* is an enduring intrigue. The 1656 Spanish fleet was not scheduled to stop at Veru Cruz and load cargo, but the fleet was forced to take shelter in the port city for 35 days to escape a large English fleet patrolling between Jamaica and Cuba.⁵⁸

The abundance of Mexico mint coins found off the Little Bahama Bank – recognized in 6,073 pesos salvaged in 1656 and the recovery of numerous examples identified by AllenX⁵⁹ (Fig. 25) – points a culpable finger at opportunistic smugglers taking gleeful advantage of this unscheduled stop.⁶⁰

Overall, what treasure salvors discovered far outstripped the figures inked into the official manifests, which listed 506 silver bars and 82,220 pieces of eight. Yet from 1656 to 1678 alone, Juan de Somovilla Tejada, Gaspar de Reyes, Juan de Ochoa y Campo and Martin de Melgar brought up 727 large silver bars and 345 small ones (total 1,072 ingots), as well as over 151,000 silver coins.⁶¹ In short, at least 100% more treasure and valuables was smuggled onboard the *Maravillas* than was legally permitted,

Just how many smaller bars, gold and silver coins, and silver *piñas* and shoes, emeralds and amethysts were stuffed in personal diplomatically-immune travel chests and below floors boards is anyone's guess. A further history-based theory argues that a major section of the stern that broke away when the *Maravillas* sank is still unfound.

Before the galleon sailed, the silvermaster Diego de Yuste enquired whether the private gold, silver, coinage, jewels, small pearls, indigo and cochineal being shipped should be listed on the official manifest. Unsurprisingly, none of the shippers took up the offer.⁶² With the total wealth of the *Maravillas* simply unverifiable, the archaeological shadow of the galleon scattered along a sprawling trail can only be profiled by systematic, ongoing archaeological surveys and recording.

Even if all the galleon's bronze cannon were recovered, and the main ballast pile has been stripped clean of finds, the *Maravillas*'s macro-archaeology remains eternally intriguing. Where is the ballast that Somovilla jettisoned from his own salvage frigate in 1656 to replace with salvaged silver? Or the anchors that three of his salvage ships lost to a storm that year? Does anything survive on land from the survivor camps set up by Somovilla on Gorda Cay and English intruders at Sandy Point after the *Madama do Brasil* was wrecked in August 1657?

Did the later 17th-century wreckers also heavily fish the remains of the *Dragón* and *El Panito* off Grand Bahama, all lost in the great storm of 1657? Or are their coherent hulls and assemblages just awaiting discovery under the deep sands of the northern Bahamas? So much of the archaeology of the *Maravillas* is yet to be discovered and its history written.

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Notes

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