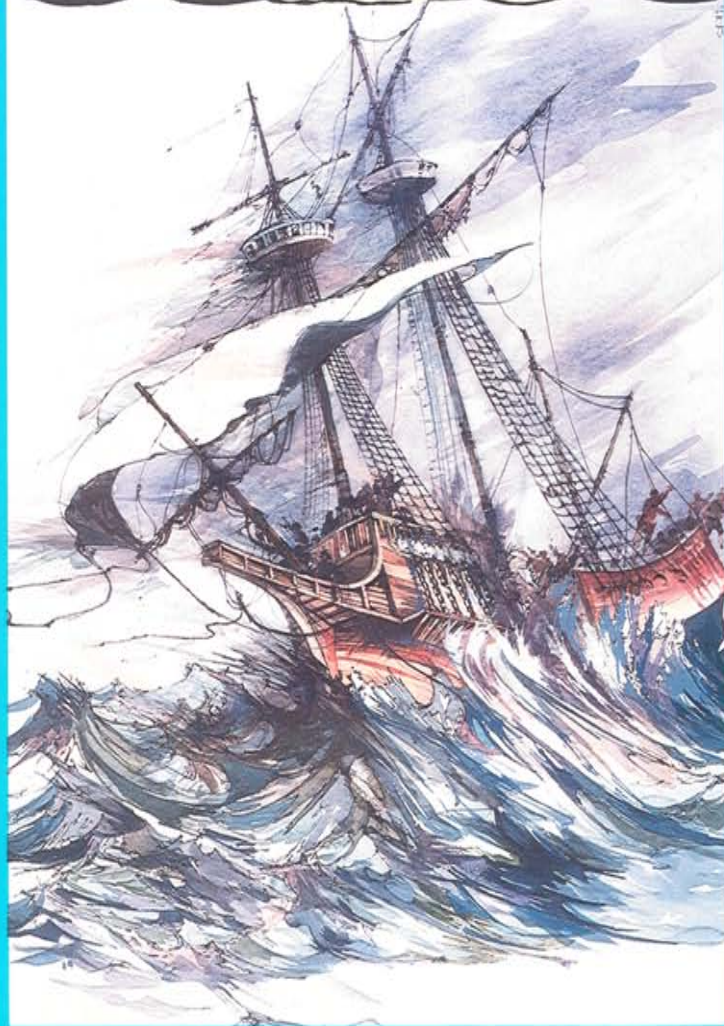
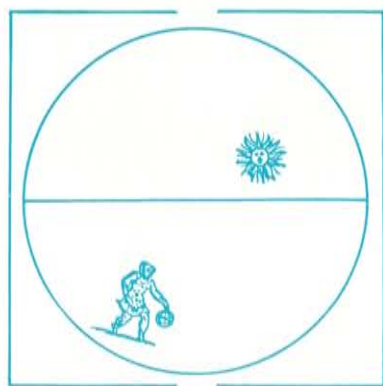


John L. Davis

TREASURE, PEOPLE, SHIPS, AND DREAMS







The Texas Antiquities Committee was created in 1969 by an act of the 61st Legislature. Responsibilities of the Committee include the location, identification, excavation and preservation of historic shipwrecks on the Texas tidelands. During the years 1972 to 1976 the Committee employed crews of professional archeologists and divers to investigate some of the earliest Spanish shipwrecks in the New World. A treasure of antiquities and historical data has been recovered from these ancient wrecks and permanently preserved for the people of Texas. This publication is designed to accompany an exhibition which will make the 1554 treasures from Texas tidelands accessible to the public for the first time.

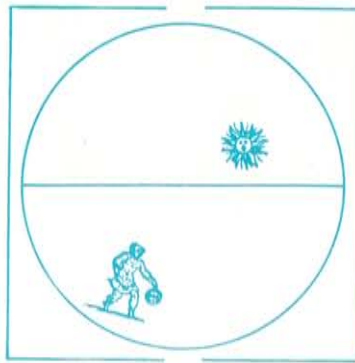
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A Spanish Shipwreck on the Texas Coast

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The University of Texas at San Antonio

the tale





n the spring of 1554, three Spanish ships laden heavily with silver and colonists, crew and cochineal, desires and dreams, ran aground

on the southern Texas coast later known as Padre Island.

The ships had left Mexico returning to Spain by way of Havana. They were driven ashore not by the dreaded hurricanes of fall, but by the deadly equinoctials that haunt the Gulf of Mexico in April. These sudden and lasting storms often contributed to the island's reputation as a graveyard.

The coast at this point was treacherous and deserted. Spain had not yet settled this part of the empire of New Spain. It was a place to lose ships and lives as well as treasure.

The shipwreck touched off an immediate salvage and rescue operation by Spanish officials, and other events lasting to the present: beachcombing, treasure hunts, court fights over artifact ownership and scientifically directed archeology and conservation efforts. Much of the ships' remains are now the property of the people of Texas.

Spain, in the middle of the 16th century, was well on its way to developing a colonial empire such as the world had not seen since Rome. Yet much of this empire was bound by rather fragile threads of politics and trade.

Charles I of Spain—more commonly known as Charles V of the faded but still existing Holy Roman Empire—ruled from 1516 to 1556, followed by his son Phillip II. The abiding passion European rulers of the day possessed was playing the game of power with the tools of family marriages, wars, treaties, trade cartels and colonial holdings.

The Spanish, by virtue of having some of the best seamen and explorers, claimed and mapped the largest slice of the newly exploited American continents—from Florida to South America. The English and French were at first left grasping only the smaller, colder, less hospitable and far less rich parts of the New World.

The Spanish were interested in more than acreage, however. There were raw products of the New World to be had, Indians to enslave while they were being educated and converted to Christianity, and wealth to be gained in the form of silver and gold.

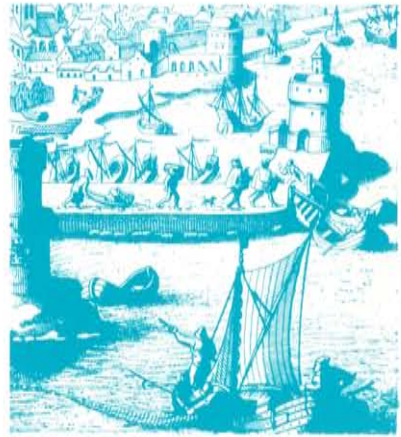
To pay for wars and other political schemes, the Spanish crown needed money—lots of money. Much of this wealth was in the form of metals from the New World.

Spanish contact with the New World was of several kinds. The first ships from Spain were those of exploration—and conquest. Missionaries and conquistadores poured into the New World looking for land, wealth and souls.

Near the middle of the 16th century, however, Charles V managed to change the sub-empires of the conquistadores into colonies settled by Spanish citizens and converted Indians. Now the ships that came were those of trade.

The crown insisted that all colonial trade go through Seville and be handled by Castilians. The house of trade, the Casa de Contratación, was founded to regulate such trade.

From Spain came settlers, soldiers, slaves and churchmen; manufactured goods such as clothing, furniture, weapons and household goods; wine and books; sets of weights and measures; lead and vinegar; soap and musical instruments; royal decrees and letters from home.



Naturally, ports in Spain were better built and equipped than the first ports of the New World—and they were home to traders establishing a worldwide empire.



Back to Spain went raw products: resins and woods, cochineal dye, hides, and most importantly, silver and some gold. Average annual shipments of silver from New Spain ran from one to 35 million pesos, or from five to over 170 millions of today's dollars.

The effect of the money pouring into Spain was not quite what one might expect.

Sixteenth century Spain was a country in financial trouble. Charles had ascended the Spanish throne as an outsider. The grandson of Ferdinand of Aragon, he had grown up in the Netherlands. When Charles arrived in Spain in 1517, he was young, ugly and could not even speak Spanish. He greatly needed the support of Spanish nobility.

Charles got the support for his reign from the *grandees* and *hidalgos* by extending favors to these ruling classes. High among such favors was one common to many a ruler: an almost complete reduction in the taxes on the rich.

The taxes to operate the country then fell on men of commerce and the middle and lower classes. These were the people least able to bear the burden of heavy taxation and the only classes whose prosperity could have developed Spanish economy and industry.

Charles V, Emperor of the Holy Roman Empire and Charles I of Spain 1516-1556.

Thus, industrial production—and, for that matter, improved agricultural methods—did not develop in Spain. The country, always in the throes of inflation, became an importer. Little silver stayed in Spain for the benefit of local economic development. It went to other European countries to pay for finished goods, for the support of Spanish armies constantly embroiled in continental disputes, to pay off staggering, long standing debts of the Spanish government to German and Italian creditors and into the coffers of the ruling class.

Ironically, Spain, having all the silver and gold of the Americas at its command, remained a poor country, always on the defensive. This situation had an effect during the next four centuries.

Spain also set up one of the most awesome bureaucratic systems in the world, both in commerce and in all aspects of government. A frontier post might be short of gunpowder, but it always had paper.

Seville's House of Trade and the Council of the Indies produced volumes of regulations and laws concerning everything from the silver trade to the approval of ship's astrolabes, from who could emigrate to the New World to how much a ship could lawfully carry. Many a regulation was good, saving lives and time, but many a regulation only added to the burdens of traders and cut into the profits of a voyage.



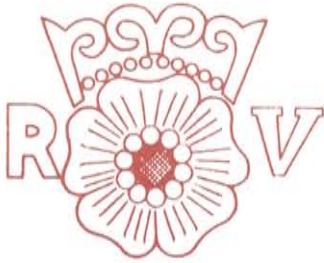
The amazing thing was that the trade persisted—for almost 300 years.

The journey from Spain to the New World was a long one in the 1550's, requiring three to five months for the entire voyage—one way. At best, it was an exhausting trip for crew and passengers.

The ships left Seville's port of Sanlúcar for the Canary Islands, the last chance before the Atlantic crossing for extra provisions, water and second thoughts about going at all. Then the route went southwest to catch first the Canary current then the north equatorial current with the usual following wind. This took the ships somewhat north of the South American continent into the islands of the Lesser Antilles.

A common first stop was the island of Dominica. Entering the Caribbean Sea through the Martinique Passage, the ships would split up, going to different parts of the New World. Those destined for Tierra Firme, the northern coast of South America, would turn south.





Rim fragment of a jar. They usually held wine, olive oil, olives, or dried beans or peas for shipboard meals.

One of the two matched pewter porringers found at the shipwreck site. The dishes, made in England, were probably personal possessions on their way back to Spain. The porringers are marked with a Tudor rose stamp (indicating English manufacture) but without the maker's initials.

Those destined for the ports of Mexico, Nueva España, would sail on the north side of the Caribbean, between Jamaica and Cuba, then through the Yucatán Channel. These ships would gradually turn southwest, giving the shoals northwest of Yucatán a wide berth, toward Vera Cruz.

The hazards of the voyage were many. Some of the ships were deliberately overinsured, old and considered only good enough for a one way trip. After the manufactured goods were sold, the silver could come back on a better ship. Many were undermanned, overloaded, underprovisioned and carried too many passengers—in spite of the regulations.

Once at sea, things could really get dangerous. There were French, and later English, ships eager to fall upon the convoy for plunder. Usually sailing with the traders was a guard of Spanish ships armed more heavily than the merchantmen, but often too slow to repulse the light ships of the privateers. Calms might hold the ships in the ocean until food ran out, or storms might drive the ships ashore. Captains of the fleet might be chosen for their political or social connections rather than their knowledge of the sea. A sudden fire might burn a ship down to the waterline.

But many a ship completed the journey—a tribute to the sailors, navigators and brave captains of the day.

In April of 1554, four ships lay in the harbor of San Juan de Ulúa, the port of Vera Cruz.

The *Santa María de Yciar*, the *San Esteban*, the *Espíritu Santo* and the *San Andrés* were under the leadership of Antonio Corzo, captain-general of the *San Andrés*. For months the ships had been slowly packed with the potent red dye cochineal; cowhides; liquidamber, a resin valued as a medicine; sugar; silk from Oaxaca; sarsaparilla root, an Aztec drug for respiratory diseases; wool; official documents and private letters; and about \$10 million worth of silver and gold.

Much of the money was private and the remainder was direct crown revenue.

These ships sailed from Spain in November of 1552. They arrived at San Juan de Ulúa in February, 1553. They had survived storm, delay in port and the many other hazards to deliver goods and now were loaded for the journey home.

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A calendar and solar declination page for an April of the 16th century.



The process had taken a long time. When the ships arrived in the port, the area was just recovering from a hurricane the previous September. Three months had not been time to repair from almost total destruction. Then, regulations on unloading and loading slowed things down. While in port, and empty between the two processes, the ships were cleared of their rock ballast and cleaned.

Sometimes, masters and captains of the ships stood on board overseeing operations. There were captain, owner and pilot Miguel de Jáuregui of the *Santa María*, Francisco del Huerto of the *San Esteban*, Damian Martín of the *Espíritu Santo* and Alonso Ojos of the *Santa María*.

Vera Cruz and the port of San Juan de Ulúa had something of the air of a boom town in the middle of the century: temporary buildings and people characterized by opportunism and easy virtue. After the sailors had made the Atlantic crossing, they had developed what were called "bestial appetites."

Spanish ports were places of carousal. Whenever ships were in port loading and outfitting for the long ocean journey, upturned wine flacons—and other carnal delights—were common.

Vera Cruz was near a marshy seacoast full of fever, occasionally the plague. It was spoken of as "the city of the dead." The *alcalde mayor* of the city, and port provisioner, advocated a permanent house of trade to speed up ship loading time and the removal of the town itself to higher ground. His pleas to higher officials went unheeded.

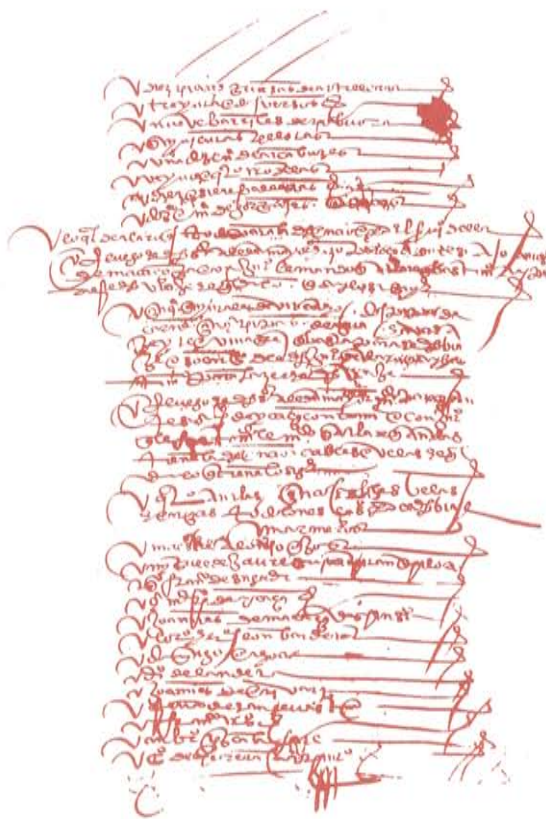
The day for departure arrived: April 9, 1554. Slow as the loading had been, the ships had also been waiting for other Spanish ships to provide protection on the voyage home. The others did not appear. Such delays were not unusual, and the captains decided to sail on and await the more heavily armed guardian ships in Havana. It was not a good decision.

Boarding the ships were about 410 people. About 300 were to perish.

In the *Santa María's* records, which still exist, 40 passengers, 20 crewmen and seven ship's boys were registered. Of the passengers, 34 were men—one a priest—and six were women. There were six slaves, five men and one woman. Three of the passengers were prisoners.



The building of Vera Cruz, Nueva España. Ports went up in a hurry as necessary beachheads for Spanish colonial operations. At times they were located in areas of disease and poor climate. Yet, the pace of trade was such that they were hard to move once established.



List of artillery, provisions and crew.

Doña Catalina de Ribera was summoned to Spain under suspicion of conspiracy in the death of her husband. She was also embroiled in a property suit with the crown. Doña Catalina was a young woman, under 25, traveling with her slave María but in the custody of an uncle, Pedro de Velasco. The full charges against her are not clear from the records that survive.

The two other prisoners were Fray Alonso de Encinas, bound to give an "account and statement to the judges" in Seville, and Ana de Reynoso, a Moor who was to be delivered to royal officials. Details of the charges against them do not survive.

While the passengers boarded, a priest registered on one of the other ships delivered a prophecy of doom. Fray Juan Ferrer stood at the dock: "Woe to those of us who are going to Spain, because neither we nor the fleet will arrive there. Most of us will perish, and those who are left will experience great torment, though all will die in the end except very few."





This small cross was probably a personal possession. It is cast gold alloyed with copper. Rings may have held jewels or small crosses.

Fray Ferrer's speech may be a fabrication by later chroniclers, but that he was a strange person is assured. He had written to Charles V about a mysterious book he had which contained matters that he could not reveal to anyone but the emperor. It was a book written in a numerical code which no one else could decipher. He asked to bring it personally.

The request was granted. In replying officially, Ferrer's superior, Fray Andrés de Moguer, the Dominican provincial of Mexico, stated: "Today I received a letter from your Lordship ordering me to send Fray Juan Ferrer to Spain to give an account of his dreams and fantasies. I shall do so on the very first ships . . . I do not regret his departure."

The priest was clearly a renegade of some sort but the book never made it to the emperor's hands.

Among the passengers were the more usual travelers like Andrés López de Archuleta and his slave Baltasar, returning to Spain. There were older conquistadores, merchants and wealthy settlers: citizens of Spain engaged in business or returning home.





The course of the ill-fated return voyage.

The route from San Juan de Ulúa to Havana was curved to take advantage of currents. From San Juan, ships sailed northeast along the Gulf coast, turned east along the 28th parallel and approached Havana from the north.

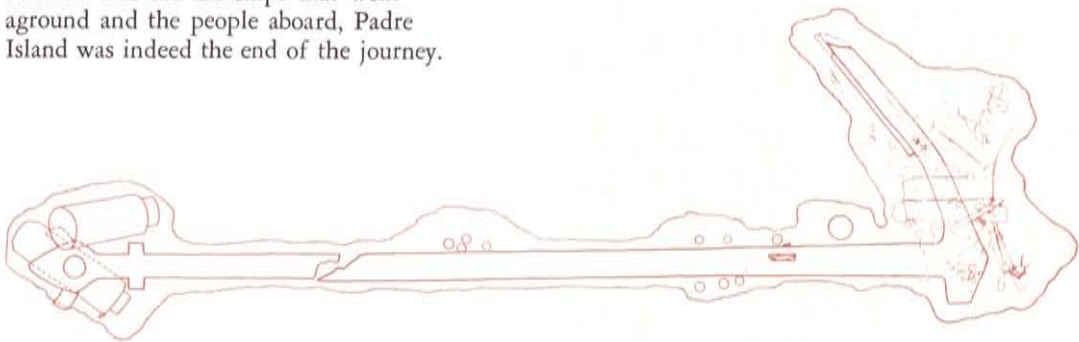
No one sailed in the hurricane season, but there are storms at other times. Unsettled weather attends the spring and autumnal equinoxes. These storms can blow for days, raising 15-foot seas and making navigation impossible. When so caught, there is little for a crew to do except run before the storm. If there is a coastline in the way, disaster is the result.

When the storm hit, the four ships had been at sea for 20 days—already the average sailing time from San Juan de Ulúa to Havana. They were probably at least over half way to the harbor when caught by the force of the gale.

The ships were blown almost due west, running before the storm; then, as the beach drew near, the crew cast out anchors to avoid grounding.

There is an old Dutch saying: "as meager as a Spanish anchor," which accurately refers to the reliability of the anchors on board the ships. Anchors broke and cables parted, leaving the ships at the mercy of the wind. Minutes later the ships grounded. Hulls split open or were swamped as the keels gouged the white sands near the beach.

The captain-general, Antonio Corzo, and the crippled *San Andrés* were gone. Either deserting the ships or being unable to give aid, he eventually made it to Havana. But for the ships that went aground and the people aboard, Padre Island was indeed the end of the journey.



An encrusted anchor is lifted aboard the research ship Longhorn, from The University of Texas, aiding the Texas Antiquities Committee recovery. The anchors, measuring four inches square (and more) on the shank, seem to be formidable pieces of metal, but matched against the weight of a ship in a full-blown storm, could be bent and even broken as they snagged the bottom.

Diagram of anchor concretion.



The coast of Texas where the ships wrecked was called the Costa de Madalena or Medanos (sand bank) de Madalena—spelled Magdalen on some maps. Generally, the area was part of La Florida, the name for all the Spanish coast north of the Río Pánuco.

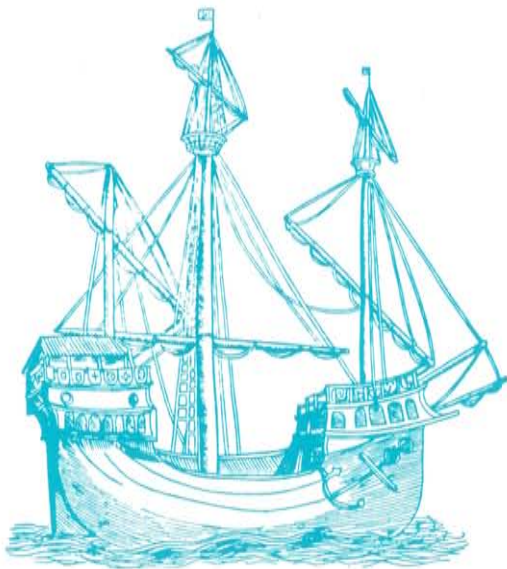
Shipwrecks were so frequent on this coast that the Spanish wanted to establish local settlements, even if French and English encroachments had not given them cause enough.

Later accounts of the survivors—there are no journals by the victims still in existence—tell a terrible but confused story.

Some of the passengers and crew survived the initial wreck, but were not prepared for what awaited them. Survival is an activity that takes determination laced with bravery, inventiveness and careful planning. It is an activity that does not allow many mistakes.

Even today the beaches of Padre Island are hostile unless one possesses a modern camper or has transportation elsewhere at the end of the day. Hard, fine sand is always blowing. There is a lack of fresh water and shelter and an abundance of insects, salt air and high humidity. Beach walking is a pleasure of short duration.





The ships had gone aground at about 26° north latitude, evenly spaced about two miles apart. As the storm died out, the survivors sat on the beach, at first unable to move.

Gradually the people united and—according to one version of the story written years later—decided to walk south. They may have thought that an outpost of Spanish settlement was near. In any case, they were equipped for a sea voyage, not an overland expedition, and they did not supply themselves from the wrecks.

The lightly clad group moved south leaving behind enormous quantities of food. They were unarmed except for two crossbows and a few swords. There was a group of passengers—men, women and children—and members of the ships' crews. Documents name five Dominican friars, Doña Catalina de Ribera and former fleet captain Andrés López de Archuleta as being among the castaways.

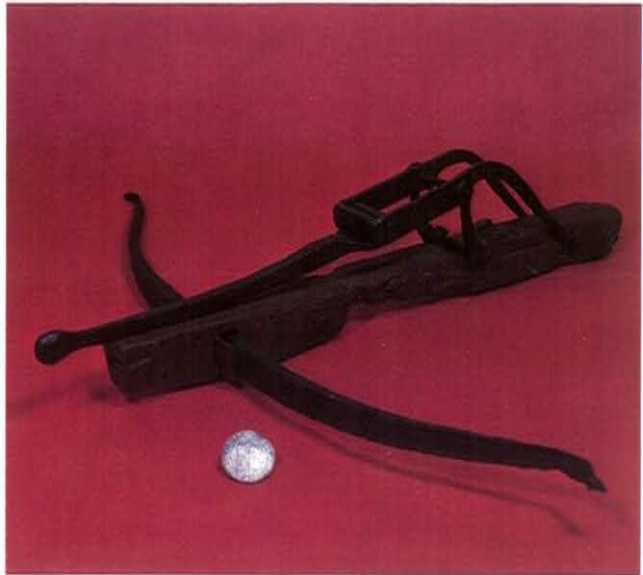
By one account, the group saw no one else for seven days until Indians appeared bringing gifts of food. But trouble between the culturally different groups led to an affray.

The Indians were at first repulsed because the Spanish crossbow had a greater range than the Indian bow. After this incident, the harried Spanish were dogged by Indian snipers that managed to kill stragglers in spite of a rear guard.

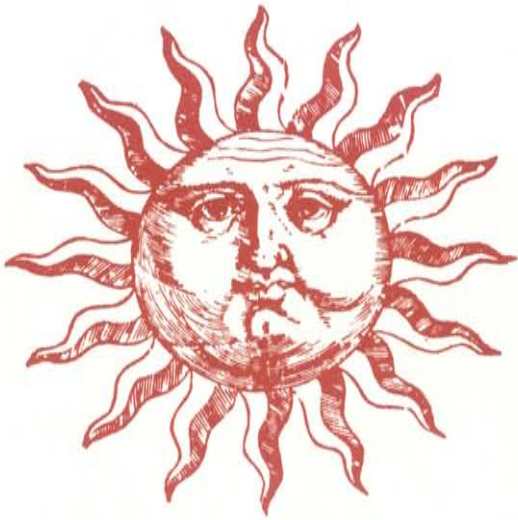
Fording the Río Bravo, a priest mistook the bag containing the crossbows for a package he no longer wished to carry. Into the turbulent waters it went, rendering the Spaniards almost defenseless.

But the Indians did not immediately launch a full attack. Capturing two Spaniards, the Indians took only their clothes, releasing them. A false hope was enjoyed by the others. Thinking that their clothes were the source of attraction, the group stripped completely and again moved south, the women and children in front to reduce their embarrassment.

Further south, the group entered areas of marsh and mangrove swamps, then thorny tropical brush. Their torment grew. Naked, without food or water, children cried to mothers who could not help them while the listless and beaten men plodded along behind.



Crossbow with the cast of the goat's foot lever, the cocking device, in place. Crossbows were small arms usually listed among the armament for overseas voyages. Cotton armor of the New World Indians was no match for the striking power of even the smaller weapons like this crossbow.

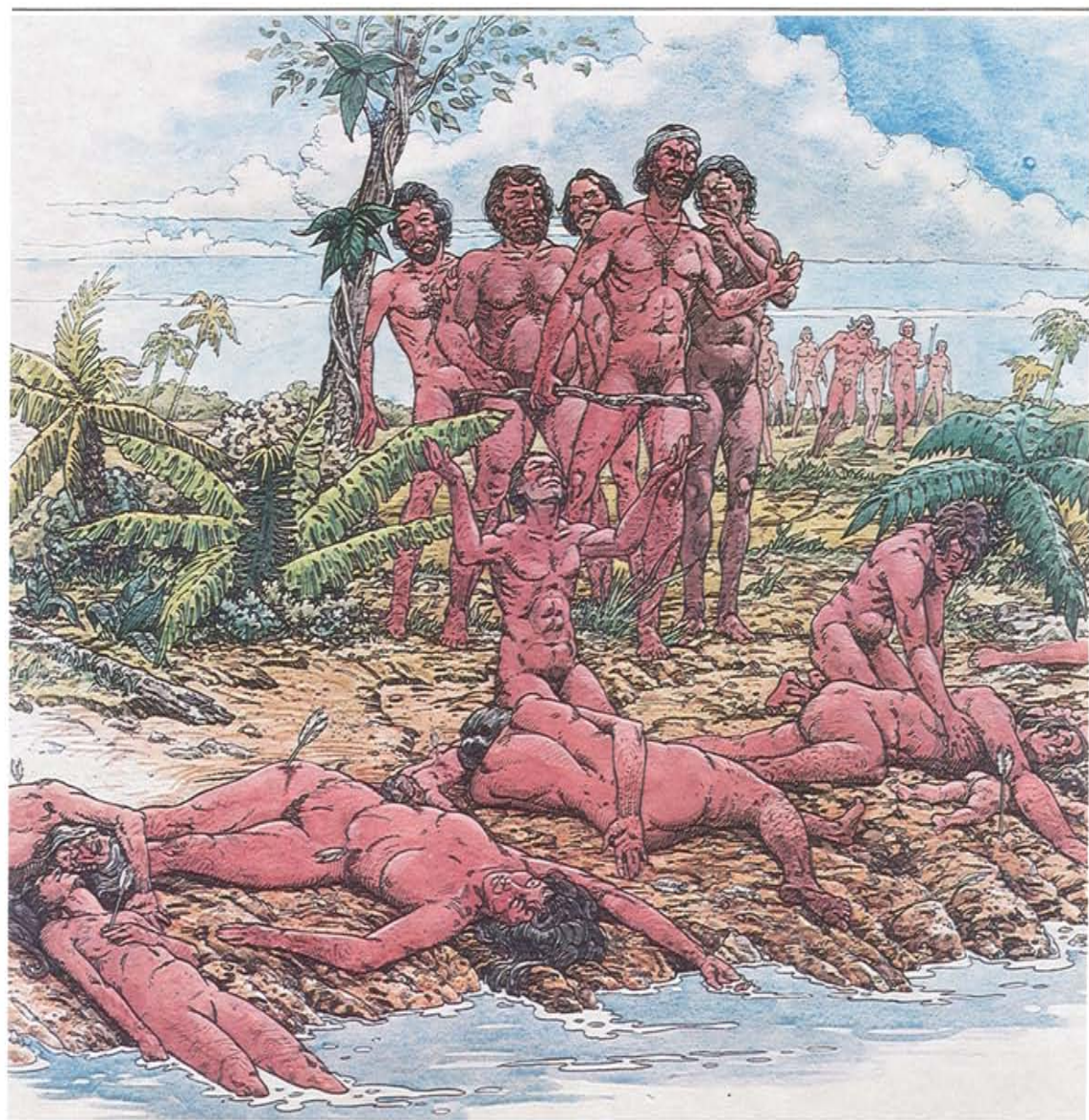


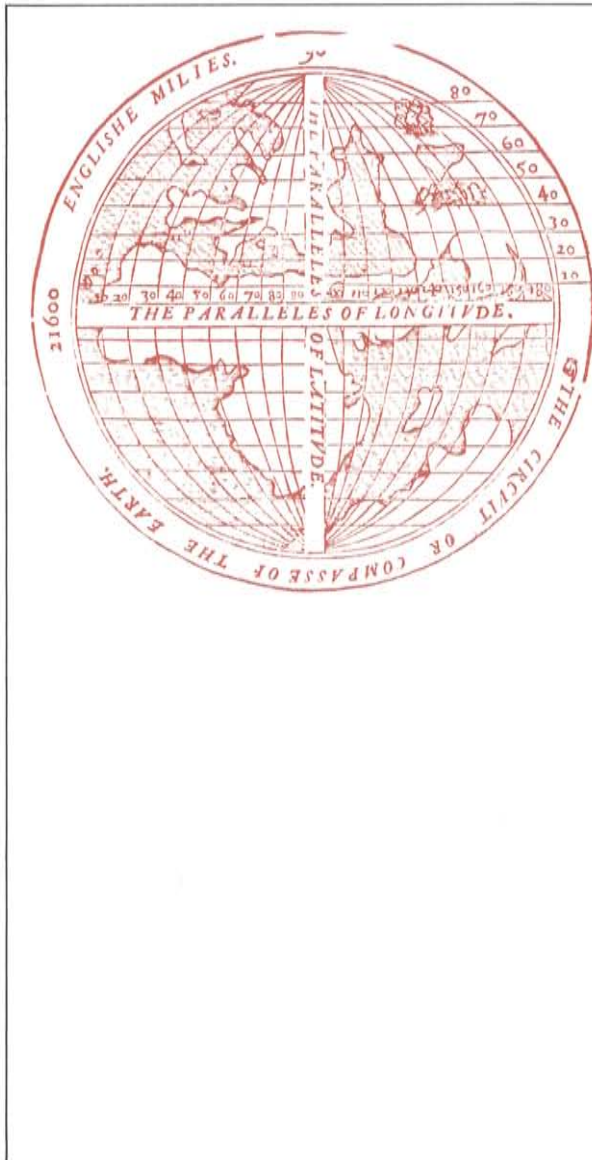
Reaching the Río de las Palmas, the women and children ran ahead to drink. From ambush, Indians cut them to pieces with arrows. The naked women could only try to pull the bloody shafts from their children's bodies before they were cut down. And the men, running upon the scene, were helpless.

The march was coming to a close. For 20 more days, the survivors pressed forward, the strongest outdistancing the main party, only to be found dead, their bodies pierced by arrows.

Somewhere in this part of the march, Fray Juan Ferrer—and perhaps his mysterious book—disappeared. He was probably killed, or perhaps went to the "remote places" he predicted for himself.

Fray Marcos de Mena, with seven wounds, was buried alive leaving only his face exposed so he could breathe his last. The others regretfully left him and walked down the shore. Later that night, warmed by the sand, Fray Marcos revived. He dug himself out and started to overtake the others. He came across the slaughtered bodies of his companions, then continued on alone. Four days later, he reached the Pánuco River. Helped by friendly Indians, the priest was soon at Tampico with missionaries. His journey took well into July after the April wreck.





But there is another version of the story. Someone had brought word of the wreck more quickly than Father Marcos. In Mexico City, on June 4, the viceroy approved funds for both an overland and sea expedition to search for the wreck. Such bureaucracy took time.

It could not have been Antonio Corzo in the *San Andrés* who had proceeded to Havana. No recorded rescue effort was made from there.

It is known that Francisco del Huerto, master of the *San Esteban*, survived. He later sailed the Indies. It is also known that the latitude of the wreck was determined with great precision—within five miles. This could only have been done by a skilled mariner ashore.

Huerto probably salvaged a small ship's boat from the disaster and sailed with skill, proper provisions and all the passengers he could carry back to Vera Cruz.

The survivors of the wreck were aware help was on the way and crossed to the mainland in search of a better campsite. There, they were cut off from the wrecks by the Indians. Only a guess can be made as to how many survived. Later accounts perhaps exaggerate the number for the sake of giving the Indians bad publicity.

On the basis of fragmentary records, some 300 people were involved in the shipwreck. A great number of these probably perished at the shoreline. About 30 went south with Huerto and the remainder were driven overland.

There are thus two versions. That is often the way with history.

Few Spanish expeditions were undertaken with more speed than a salvage operation. By June 6, 1554, Ángel de Villafañá had left Vera Cruz, heading an advance group, probably to prevent the ransacking of the wrecks by the citizens of Pánuco. García Escalante Alvarado followed the next month, as soon as the preparations for the salvage crew were made.

Alvarado set out with six salvage ships: two large vessels, the *Mendoza* and the *Santo Espiritus*, and four smaller barks or chalupas. His food supply included 20 steers, corn, wine, sugar and biscuit. He took arms and crossbows, equipment for the divers, trunks for the treasure and a ream of blank paper. In his crew of over 100, there were 11 divers.

Inve[n]tario de lo que se halló en el naufragio de los navios de la Armada de España que se hundieron en el mar de Cortes el día de San Juan de Mayo de 1554.

Suma de las cosas que se hallaron en el naufragio de los navios de la Armada de España que se hundieron en el mar de Cortes el día de San Juan de Mayo de 1554.	Suma de las cosas que se hallaron en el naufragio de los navios de la Armada de España que se hundieron en el mar de Cortes el día de San Juan de Mayo de 1554.
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Record of treasure salvaged from the three lost ships.

Record of treasure salvaged from the three lost ships.

In late July they anchored off Padre Island. Villafañá was already at the site with his small force of soldiers and one diver. They had already begun work on Huerto's *San Esteban*, still partially out of the water. But their records do not mention the soldier Francisco Vásquez. Later commentators said he was rescued at the site.

Alvarado's boats drug the waters in search of the other ships. One by one they were salvaged: first the *San Esteban*, then divided crews worked on the *Espíritu Santo* and the *Santa María de Yciar*.

Details of the diving work are not given, and no clear indication exists of any breathing devices. Elsewhere, the Spanish had used large metal bells, lowered downward to provide divers with air during salvage operations.

At this site the ships lay in two to three fathoms of water, not over 18 feet, but the descent into a broken ship's hold was a dangerous task in the turbulent waters. Ropes were put down to the crushed hulls and decks of the submerged ships. The divers worked only for the length of time they could hold their breaths—a considerable length of time for trained men.



Lifting hooks and lines were attached to heavy items. These were raised by shipboard capstans. Even so, the work was slow. Most often a box of treasure had to be lifted piecemeal to the surface.

Salvage came to an end on September 12. The divers took a formal oath that no more treasure could be seen.

After the salvage ships had been searched and hundreds of pounds of silver hidden literally everywhere had been recovered totals showed a recovery of 35,804 pounds of salvage including a small quantity of gold. This meant that about 51,330 pounds of precious metal still lay in the sands of the Gulf.

With the treasure back in Vera Cruz, the deductions started. The salvage operation itself had cost 35,687 pesos. About 35,000 pounds of silver remained to be taken to Havana. Admiral Diego Felipe was assigned the task. Even this repeat voyage was a disaster. One of the admiral's five ships did not even make it out of the harbor of San Juan de Ulúa before it sank. Admiral Felipe's remaining four ships arrived safely in Spain with the salvaged treasure in 1555.

The treasure aboard the *San Andrés* had reached Havana after the storm, but that vessel was unable to sail further. The silver was transferred to ships under the direction of Captain-General Farfán. Not being advised of events in San Juan de Ulúa, Farfán sailed ahead of Admiral Felipe. His voyage also ended in tragedy.

The ships of Spain often made trouble free crossings, but not this time. The wreck of 1554 upset the Spanish sailing strategy—it started a chain reaction of disaster.

Farfán sailed at the wrong time. He was delayed by previous wrecks and the salvage operation. His apparent lack of judgement concerning prudent sailing times in the Atlantic was also attributed to a "kept woman." If Farfán indeed had a young lady aboard, as was alleged, he was not the first nor last to reap disaster from such a course. Certainly such activity could be considered a further hazard to voyages.





Some of Farfán's ships were driven back to New Spain ports while some, making the Atlantic crossing to the Azores, ran into a winter storm. The flagship was lost in the channel between Florida and the Bahamas. Two more ships wrecked on the southern shores of Spain.

Four treasure cargoes had been lost even after the salvage. No more than 150,000 out of the 375,000 crown pesos could be accounted safe and only a comparable percentage of the private money reached Spain. Final legal settlements would stretch into years.

One contemporary remarked, "it was a sight worth seeing to behold the many suits that the shippers presented in an effort to collect what they claimed they had sent. Many became rich with the fortunes of the unfortunate ones that died in the wreck."

Spanish officials authorized another salvage effort which may never have been organized, the fact of the wreck added details to the maps of Spain, and the Spanish government once more decided additional settlements were needed on the Gulf coast.

Padre Island, today.

But the wreck site itself lay neglected for over 300 years.

Yet shipwrecks are not forgotten. There are always men who know the currents and routes and are willing to look for treasure. Besides, one of the most popular shore activities is beachcombing. Most of this activity takes place at the north and south ends of Padre Island within about a mile of the end of modern roads. A few stalwart individuals walk further, some sail down the island and a few ride four-wheel drive vehicles over the shifting sand.

Here and there is a coin. Rarely, a plate of silver. Sometimes, news of a location filters back to the treasure hunter or the archeologist.

There is a distinct difference between the treasure hunter and the archeologist. The treasure hunter searches for items of monetary value or beauty and will remove these items, taking little note of how they were found. The archeologist goes looking for the past—the story of man. The found items are never kept as personal possessions, and a bit of water-soaked wood may be as valuable as a piece of gold—in terms of what it has to say about life.



A copper maravedi coin

the search





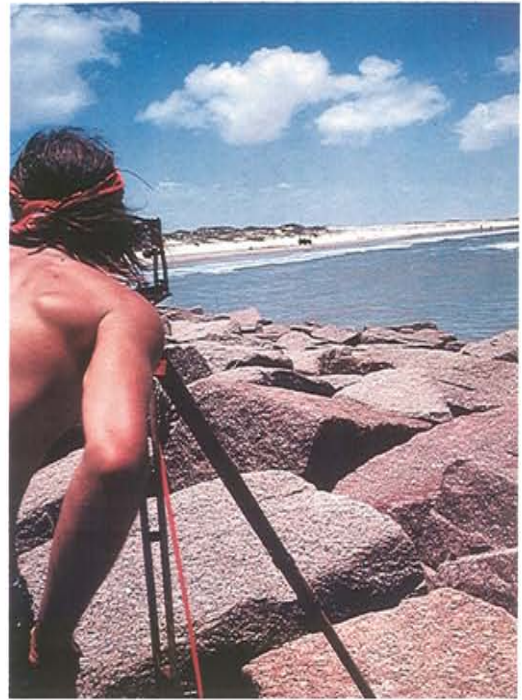
he first modern efforts concerning the three ships were by treasure hunts.

The first known modern salvage of the Spanish wrecks was attempted by a group from Gary, Indiana, under the name of Platoro, Inc. This treasure hunting enterprise operated from September until December of 1967, when it was stopped by a court order.

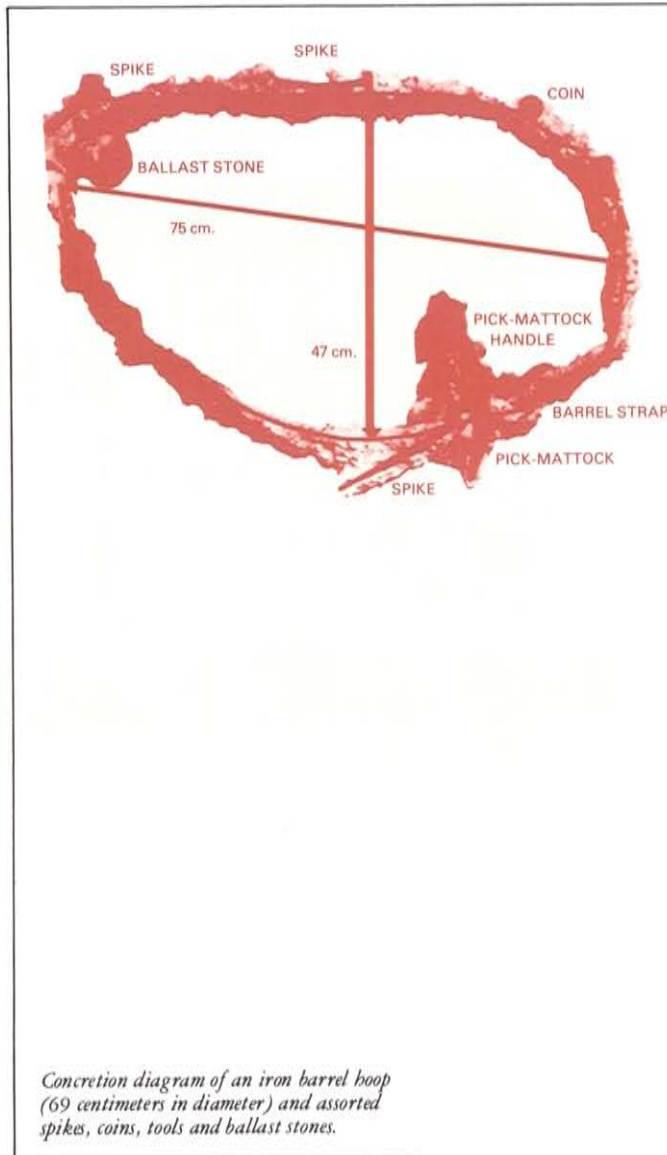
Texas officials and citizens—hearing about the activity through newspaper stories—raised the question of ownership. The salvaged items came from the tidelands. And the tidelands are public property.

In the meantime, the collection was taken by Platoro to Indiana. State officials made arrangements with Platoro to return the artifacts to Texas pending the court's decision as to ownership.

By 1969, most of the known collection was back in Texas and a state Antiquities Code was passed by the legislature. This established the Antiquities Committee to supervise salvage and preservation of prehistoric and historic artifacts from state lands, including items from the tidelands. Thus the Platoro salvage gave the state a needed impetus to preserve its past.



A surveyor sights toward the beach from the jetty. Accurate shore positions guarantee even spacing in magnetometer runs that follow.



Concretion diagram of an iron barrel hoop (69 centimeters in diameter) and assorted spikes, coins, tools and ballast stones.

Most of the Platoro recovery was from the *Espiritu Santo*; or 41 WY 3, the survey notation. The items were placed in temporary custody of the Texas Archeological Research Laboratory at Balcones Research Center, The University of Texas at Austin.

Here, plans were underway for the scientific preservation of the items and their study.

Because the Platoro group's goal was treasure, much data was lost in their recovery. No adequate maps were made of the diving site and no information was taken as to the relation of the recovered items. Because of this, clues were destroyed and much less is known about the ships and the men who sailed them than might have been learned.

In 1972 and 1973 an extensive field survey and artifact recovery was carried out by the Antiquities Committee under the guidance of the State Marine Archeologist. This excavation, done with rigorous care according to scientific principles, also worked with the presumed site of the *San Esteban*, or 41 KN 10.

Additional artifacts were recovered for what was now a magnificent assembly of Spanish culture in the 1550's. The collection reflects the activities of a former world, a world that included Texas and helped shape our lives today.

Surveys in 1974 and 1975 confirmed all the wreck sites and found still more objects. The resting place of the third ship had apparently been largely destroyed by the dredging of the Mansfield Cut through Padre Island in the 1940's.

Underwater excavation—even an operation carried out with scientific care and modern equipment—is a hazardous and difficult task.

And the shallow waters of the shore do not help. Down 20 feet in often murky water, fighting shore currents, the divers are responsible for carefully blowing away sand with jets of pumped water. They must photograph and carefully record the positions of all finds and bring up shipwreck remains that at first resemble valueless concretions of rock.

Diving, the actual recovery, is usually preceded by making the best location map possible. One of the best kinds is that produced by a systematic magnetometer survey.



All that remains of the keel of a ship. The white oak fragment measures 16 feet. The section aided in estimating the ship's size, a fairly small 97 feet.

An archeologist working for the Texas Antiquities Committee brings up a gold bar.



On board the Texas Antiquities Committee ship, the magnetometer is a key instrument in underwater metal detection.

What is searched for is metal—or rather the slight difference made by a piece of metal in the earth's magnetic field. The magnetometer is an instrument that measures this difference. Its sensor is towed by a boat back and forth in a carefully plotted course offshore.

Each time an unusual reading is noted—an anomaly—the calculator plots it as a spot on a track. This then makes up a map, which may be enhanced by computer. A large disturbance, a significant anomaly, indicates more than sand. It may indicate a modern wreck, a hunk of chain dropped by a fishing boat the previous day, or a Spanish cannon.

Buoys are set out and the final decision depends upon the diver.

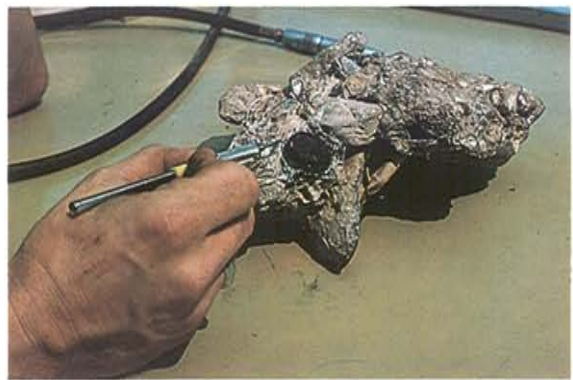
The recovery work and the conservation procedures in the laboratory were backed up with an archival research and translation effort. Researchers and translators worked in the major archives of Spain, Mexico and Texas. Over 15,000 manuscript pages were copied many of which lent information about the wreck, cargoes and people involved. This information was critical in the interpretation of archeological finds and in unraveling the story.

It is a goal of scientific conservation to clean and preserve artifacts so they are stabilized from further decay and are left intact for interpretation and study. No process should injure artifacts nor detract from their appearance. Conservation, including the best documentation, makes possible permanent preservation and public exhibition of the Spanish treasures.

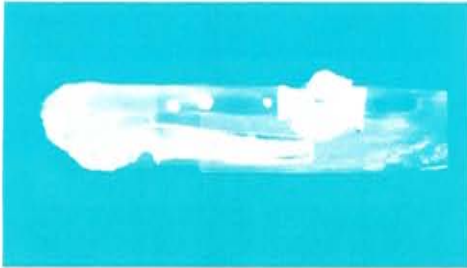
This is a difficult job when dealing with a mass of rocky material that resembles slag. The concretions containing the remains of the shipwreck artifacts varied in size from a single coin to several thousand pounds. Yet unless conservation is done, knowledge is lost. These items, this "material culture" in the archeologist's words, are the fabric of the past and the present.

When the artifacts, from all of the recovery operations, reached the Texas Archeological Research Laboratory, the laboratory staff had no experience in the conservation of materials recovered from the sea. They do now.

Some of the items from the Platoro recovery had been cleaned, occasionally by destructive methods. Many items were still covered with encrustations of chemicals dissolved in seawater, products of corrosion of the artifacts themselves, sand and shells.



Removing the encrustation from an artifact with dental picks and air chisels.



An x-ray of the crossbow showing the trigger mechanism.

Concretions are x-rayed before restoration work is undertaken.

Specialists from all over the world offered their help in setting up the special laboratory which was soon completed as a first-rate scientific facility. Cleaning tanks were installed, an industrial x-ray machine was employed and vaults for the valuable items were brought in. Even many of the chemical procedures used in restoration were newly devised.

Metal makes up the bulk of a recovery of an underwater find because wood and cloth rot away. Particularly in the sea, metals react with their environment, rusting or otherwise altering chemically.

The metals of the 16th century were gold, silver, iron, copper, lead, tin and their alloys. Gold alters little, being almost impervious to chemical change. Silver and lead change somewhat, particularly when in contact with other metals, and iron and copper alter most of all.

When items reach the laboratory, they are first stabilized to stop the chemical reactions. Concretions and iron objects are soaked in solutions that stop the corrosive effect of residual seawater chemicals and the atmosphere.

Next, the concretions are x-rayed. This reveals what is inside the lumps of material. On occasion, a great deal of an artifact is left, at other times only a powder remains in the shape of the original item.

If there is enough left of the artifact to conserve, tracings are made of the x-ray, and the concretion is gently broken. Individual items are freed with tiny air driven tools, a process as detailed as dentistry.

After an item is free from the bulk of the concretion, electrolytic cleaning can be carried out. This is a chemical reaction, driven and controlled by an electric current passing through the artifact while it is submerged in liquid. In some ways, it is the chemical opposite of what happens under the sea. Properly done, this chemical cleaning and stabilizing process can halt and even reverse the metal decay. But the methods are slow. Electrolytic cleaning of an iron cannon can take up to 12 months.

The items are then rinsed and may be coated with an almost invisible wax to stabilize the surface against further change.



Measuring electrode potentials in an electrolytic cell at the TARL laboratory. Through such basic scientific determinations conservation of encrusted artifacts is made possible. The proper current and electrolytic bath chemicals can now be chosen for particular artifacts.

This process is so exact that most surface marks are retained. Thereafter, the item is preserved not only as a beautiful thing, but also as a permanent reference.

Why take care when dealing with the past? For that matter, why deal with the past at all?

First of all, there is the beauty of the items. They should belong to all people. Collections hidden in private hands and objects melted down for sale are examples of wasted beauty.

And obviously, the present is a child of the past. George Santayana said that "those who cannot remember the past are condemned to repeat it." Not only the triumphs but also the mistakes of Spain 400 years ago are good lessons today.

People need to know where they come from for a reason beyond nostalgia. A person who cannot learn from past experiences and use this knowledge is classified as retarded. He remains an infant in each day. So with societies and cultures. The former activities and dreams of men tell us where we have come from and a lot about where we are going.



his is a precious flame of knowledge derived in no other way. And the keepers of such a flame are the sifters of the earth, the

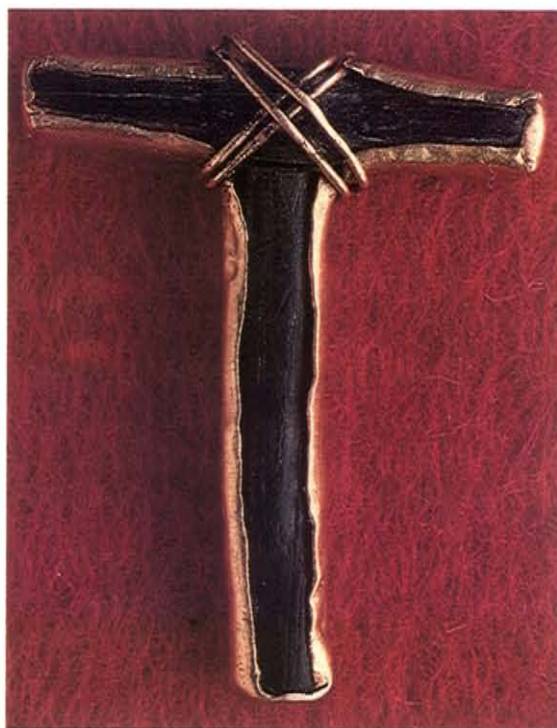
examiners of time, the archeologists and historians.

What remains of the shipwreck is nothing less than the dreams of former men. These dreams constructed the world of the present.

Items of the past are preserved not only for their inherent beauty, but as things from which one can learn. They are as fresh an experience to see now as they were when put aboard ship some 400 years ago. From these items, people can not only see earlier dreams, but can also form their own.

At the turn of the century Professor Walter Raleigh said "the mind lives by its takings, and a fresh experience feathers the wings of the human spirit, and lends them scope and power."

Ships, to the people who sail them, are a means of making a living. To passengers, they are transportation. They are the ways of trade, exploration, settlement and communication.



A personal item found at the shipwreck site was this gold cross. It is broken, but the gold binding around the wooden core can still be seen.



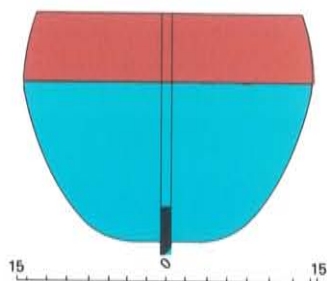
Not all passengers on the Spanish ships were people. The ubiquitous cockroach has been a companion of man in all centuries. A modern specimen is shown next to a fossil wing from a concretion.

To an archeologist, the wreck of a ship is a time capsule.

When a ship leaves port—particularly a ship of trade on a long voyage—it is a self-contained slice of society carrying supplies necessary to maintain the life of the crew and passengers and many products of the culture to which it belongs. The ship itself is a product of the technology of the day it sails. The crew and passengers represent a section of their society. What they carry with them reflects their lives.

The disaster of a shipwreck is often sudden. Later recovery of items from the site provides knowledge of a society's science, business, trade, government, monetary system, religion, amusement and even the dreams and desires of the people.

From the wrecks of the *Santa María de Yciar*, *San Esteban* and *Espíritu Santo* has come a wealth of items. There are anchors, fragments of wood, crossbows, cannon and shot, spikes, straps, tools, silver coin and plate, gold, navigational instruments, sounding weights, straight pins, chain mail, parts of boxes and barrels, rope, preserved food fragments and even the remains of cockroaches.



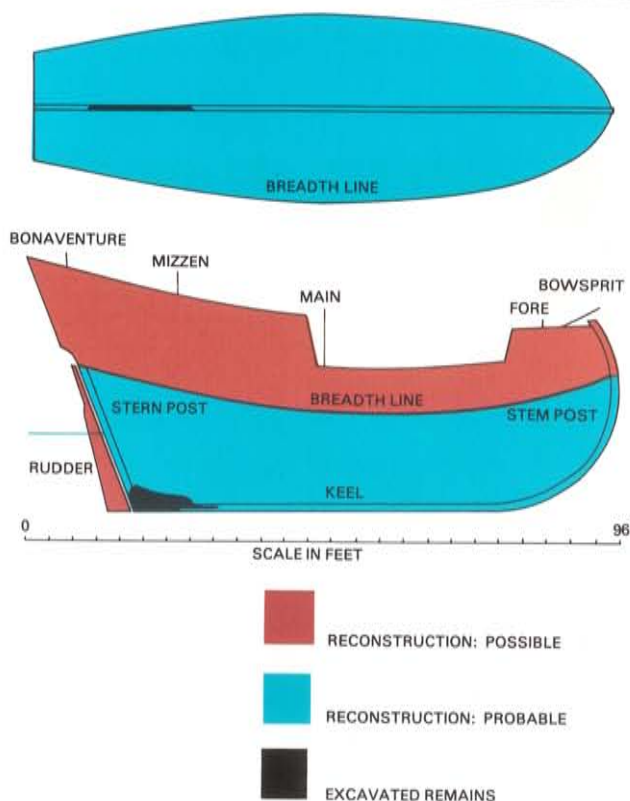
The ship was a balanced system that could be thrown awry by trying to sail in the wrong weather, through greed of loading too much cargo, making mistakes in navigation or not provisioning properly.

In today's terms, a ship was a closed ecological system which if abused could result in death. There is a close analogy, and a very understandable one, between the ship of the 16th century and today's planet earth.

These ships that went aground were not the large Spanish treasure-frigates or galleons that later were more frequent in the Gulf and Caribbean. In fact, a complete reconstruction of these ships is not possible at this time because all the facts are not known. This kind of discovery is a continuing process.

But a good deal is known. There are ship illustrations of the day and these show vessels that look slightly fat and smaller than present freighters, but are certainly seaworthy. The wrecked ships were small sized traders, less than 100 feet long, capable of carrying a few tons of cargo.

The ships of the 16th century carried bulky cargo and a lot of sail. This accounts for the most obvious things about them—the large, practical hulls and the abundant rigging.



The keel piece recovered presumably from the San Esteban helped with the reconstruction of the ship's probable hull shape. This modern drawing gives an estimate of the hull of one of the wrecked ships.



Recovery of a cannon—a deck bombard—by the Texas Antiquities Committee: a) raising the bombard from its underwater resting place; b) loading the heavily encrusted bombard aboard a recovery vessel at the site; c) cleaning in process at the Texas Archeological Research Laboratory in Austin, Texas.

The sails and masts are today known more for their romantic aura than actually how they were rigged and used.

The ships were armed with cannon. The larger were to repel enemy ships, the smaller were antipersonnel weapons. Weapons of a 16th century ship were incredibly crude by today's standards. The bombard was built up of straps and hoops of iron and was considered to be—at worst—as dangerous to the gunners as to the enemy.

These guns were breechloaders, which meant less exposure to the gunners and a faster rate of fire.

Separate breech chambers were loaded with powder and plugged. The shot—cannonballs of stone, lead or iron or simply scrap—and wadding was put in the barrel. The breech chamber was placed, wedged in, tied down, primed and fired.

The crew slept on the main deck or between decks, on or next to their sea chests or other gear, under blankets or pieces of old sail. From the New World, sailors learned of the hammock, which eventually became the bed of crewmen on most ships.



The captain, master or owner had his own room. Officers of the crew slept in the sterncastle of the ship and sometimes there would be bunkrooms for passengers.

The ships were crowded, busy, rough and smelly. The deck was occasionally the best place to be. At least it afforded sun and fresh air. Travelers' accounts made reference not only to the beauty and danger of the sea but also the intolerable length of voyages, unsanitary conditions and, at times, to the occasional coarseness of the crew.

Cooking was done forward on the ship over a small fire in a sand box. Provisions for a voyage included corn, grain, ship's biscuit (cooked ashore), wine and vinegar, sugar and even livestock such as steers and sheep—and occasionally chickens. If a ship was becalmed for a long time the food ran out or became increasingly distasteful. At times, crew members would eat at night so they could not see the maggots crawling in the biscuits.

The toilet of a 16th century ship was a little platform hanging over the back side rail—the *jardines*. This was the object of many a joke whenever a wave would break over the user and certainly was not a very private place.



In the hull space not filled by cargo was kept the ballast, usually sand or stones to make the boat ride properly in the water. Along the keel, seawater, food scraps, urine and vomit collected in the bilge. So foul would this become that "rummaging" would be necessary. When there was time, the ballast would be taken out and placed in the surf to clean. The slime would then be scraped from the boat and the hull rinsed with vinegar. Then the washed ballast would be returned to the hold.

At sea, storms would put the crew in a frenzied state as they worked to save the vessel. Passengers would become a quivering mass of humanity lodged between decks. But there were the good days when the wind was fair, the sun shone and nothing was better than a day under sail in the great days of exploration.

The ship was a timely slice of life. It was the means of empire and an exhilarating experience. There is no doubt why ships have attracted some of the worst curses and best poetry of 30 centuries.

There were two categories of treasure: crown money, of which no more than 25,000 pesos were supposed to be on any one vessel, and private money. The latter was often in coin, the payment for manufactured goods shipped from Spain. Some coin on the ships was simply traveling funds or the wealth of individual families being taken to Spain.

The treasures were usually packed separately. When private wealth arrived in Seville, however, the crown took a close look. If it was a time when the government was embarrassed by debt, the merchants' funds were confiscated for crown use, in part or in whole. This so imperiled Spanish trade, besides making the merchants righteously angry, that protests were frequent. Many a trading house went bankrupt. The result was a reluctance of Spanish merchants to engage in manufacturing or trade.

Determining today's equivalents for 16th century coins is complicated. Coin values were based on weight of silver and so can be figured according to current value. The purchasing power, however, was quite different in earlier years.



the find





he treasure consisted of bullion and coin. Pieces of bullion, gold or silver, were carefully and individually stamped to indicate origin, taxes paid, value and, perhaps, ownership.

Coin value and equivalents varied, but in the mid-16th century, a peso had the value of one ounce of silver, or 272 maravedis, about \$4.63 today. A mark of silver was a term of weight equivalent to 8.12 pesos or \$37.60.

A single maravedi was worth 1.7¢ in today's coin.

The real was equal to $\frac{1}{8}$ ounce of silver, or 34 maravedis, and was often called the tomin.

A four real coin was known as a toston and the eight real (one peso) coin, not being minted in the New World at the time of this shipwreck, became the "piece of eight" in Caribbean pirate stories. Where no small change was available, this coin was cut up, giving rise to the "two bit," "four bit" idiom that comes down to the present day.

A ducat was valued at 375 maravedis, about \$6.35 today.

The peso de oro de minas, a gold standard, was worth 450 maravedis.

The silver—and the small amount of gold—came from the mines of the New World. The bulk of production was silver, the mainstay of Spanish and colonial economy.

Most of the recovered coins were 4 reales pieces. A small percent were 2 reales, and one was a 3 reales piece. They are Carlos and Johanna pieces from the first mint of the New World founded under Charles I of Spain. His mother Johanna, "la Loca," daughter of Ferdinand and Isabella, was nominally the queen, but was so mentally disturbed that Charles ruled almost alone.

After Johanna's death the coins continued to be stamped CAROLVS ET JOHANA REGES on the obverse. The center of this side bore the royal shield showing the lions of Leon and castles of Castile. A small pomegranate centered at the base represented Granada. The shield is topped with a crown. On this side of the coin, the mark M, o or o

M, M
o

represented the Mexico City mint, while the other letter was the assayer's initial. This varied according to the man in office: "R" for Francisco del Rincon (1536-1538); "G" for Juan Gutierrez (accurate dates unknown); "F" for Esteban Franco (1538-1540); and so on through a list more or less known today. Most of the recovered coins bear the mark "L" for Luis Rodriguez.

On the reverse of the coin the legend HISPANIARVM ET INDIARVM (Spain and the Indies) surrounds the Pillars of Hercules (the name for the Straits of Gibraltar and the former jumping-off place of Old World voyagers).

Across the pillars is written PLVS VLTRA, perhaps an adaptation of Alexander the Great's motto, NE PLVS VLTRA.

At times, the assayers mark is on this side of the coin. The denomination was stamped between the pillars.

A Santo Domingo 4 reales coin was found at the wreck site. This mint usually turned out coins much more crude than Mexico City workmanship.

The coins were made from silver bullion which had been hammered first into sheets. They were then cut into coin sized blanks, then struck between patterned dies to impress the metal with the lettering and design.

It took a hard blow to get a good result and many a coin was somewhat malformed.

The copper coins recovered are certainly not from the treasure but from a pocket or purse. They were originally made for Indian market use. The Indians, not liking copper, refused to use them and would throw them away. The Spanish used them for small change.

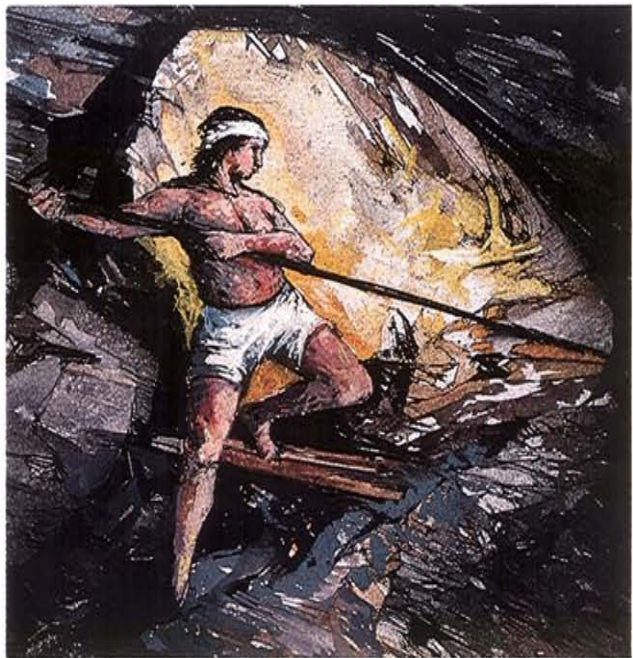


Mines from Mexico to Peru were worked first by Indian, later black slaves. Here the ore was crushed and the silver extracted and refined. Molten silver was sometimes poured on sand or stone to form easily stacked plates. These were carefully assayed for purity and value. When taxed, they could circulate as items of exchange. They received surface marks indicating value, assay quality, taxation status, ownership and even mine location. From all this wealth, of course, the crown received an initial fifth.

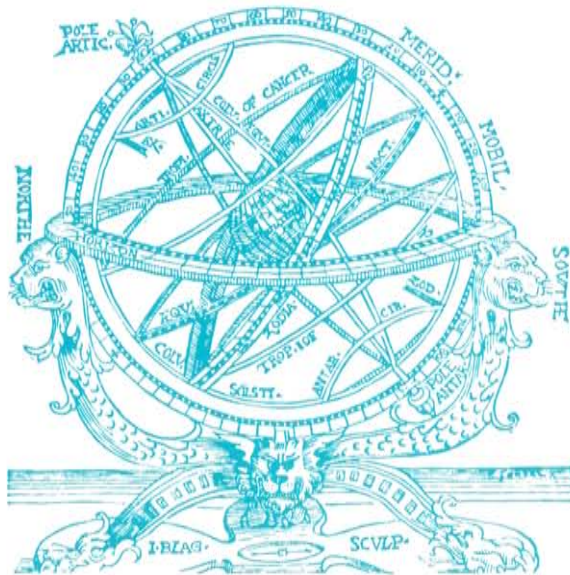
Mexico City, and most of the major cities of the New World, operated mints. These were carefully licensed by the crown and struck standard silver coins for exchange.

Navigation was a critical part of ship-board activity. Good navigation provided safety, and was the means of an efficient voyage as well as the method of getting where you were going and back again. The 16th century was an age when there were no accurate maps and many a shoreline was simply, and dangerously, unknown.

Coastal navigation, when the shore could be seen, required fewer instruments than blue water positioning but was more dangerous because of shoals and narrow channels.



First Indian, then black slaves worked the silver mines in Spain's New World.



An engraving of an armillary sphere, an astronomical instrument made of metal rings, that indicates the circles of the celestial sphere, the zodiac, and the tropics. It was both a stellar map and a teaching instrument.

Near the shore, the main necessities were dividers, a chart (if there was one), sounding lead and line and a good lookout or two. Useful also was a good memory if one had been there before.

Near land, anywhere the ocean floor was less than about 100 fathoms (600 feet), one could use the sounding lead. The lead weight was thrown over the bow on a long, marked line. It not only indicated depth, and therefore gave a clue to where the ship was, but also a hollow in the end filled with tallow or wax would bring up a sample of the ocean floor.

What was on the sea floor could indicate the position of the ship. "Rutters," printed sailing directions for known waters, would list which side of an island or harbor would show a particular colored sand, mud or shell. Mud from rivers would indicate their location even if they could not be seen.

Hazards, like the shoals on the north side of the Yucatán Peninsula, could be avoided. Although the method sounds crude, the lead and line could fingerprint the ocean floor quite accurately for the early mariner.

Dead reckoning, in coastal waters or on the open sea, was one of the more common navigational methods. The pilot kept as accurate a record as he could of the ship's direction and speed. Direction, the course, was determined by a compass and speed by a chip of wood thrown overboard and timed (with a small hour-glass) as the ship moved past. With a pair of dividers, the pilot kept a plot on his chart.

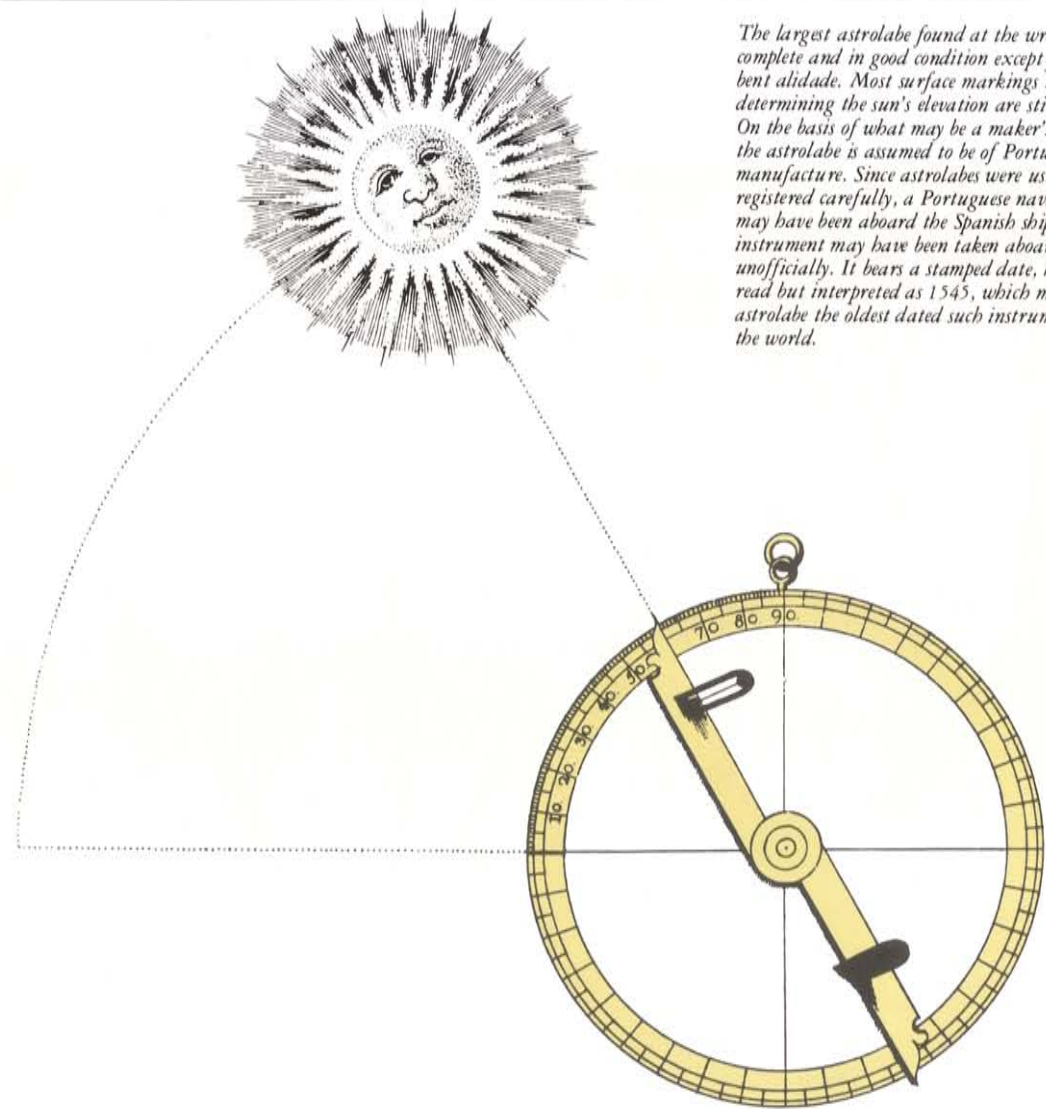
But in a good wind, the ships did not quite sail in the exact direction the bow, or the compass, pointed. And estimates of speed were not exact. Yet in the hands of an experienced navigator, it was a good method. There are few people alive now who can practice this method—as much an art as science—of the early navigators.

Position fixing was somewhat crude away from land, yet methods were developed which remained the same in theory from 1500 to 1900.

There was no exact method—until the construction of accurate chronometers in the 18th century—for determining longitude, east and west position. In blue water, the mariner counted on dead reckoning.







The largest astrolabe found at the wreck site is complete and in good condition except for a bent alidade. Most surface markings used for determining the sun's elevation are still visible. On the basis of what may be a maker's mark, the astrolabe is assumed to be of Portuguese manufacture. Since astrolabes were usually registered carefully, a Portuguese navigator may have been aboard the Spanish ship or the instrument may have been taken aboard unofficially. It bears a stamped date, hard to read but interpreted as 1545, which makes this astrolabe the oldest dated such instrument in the world.



Latitude, the distance north or south of the equator, was a far easier matter. Always involving some angle-measuring device, the determination of latitude could be taken from the elevation of either the sun or the north star.

In daytime, the height of the sun at noon was measured with an astrolabe. The astrolabe was held at waist level and the sun's light was directed through two pinholes on the rotating arm until a bright spot of light fell on the deck. The indicated angle, the altitude of the sun, could be subtracted from 90° to give the sun's angle from the zenith. The mariner always carried tables which gave—for each day—the sun's actual declination, its angular distance from the equator. This angle, plus the zenith angle, was the latitude of the observer.

Latitude from the north star was even easier to compute. One simply sighted through the astrolabe at the north star. The elevation in degrees was—almost—the observer's latitude. Due to the fact the north star describes a small circle around the pole, a slight correction was necessary.

Latitude could be determined fairly accurately. With repeated observations ashore, an accuracy of a bit less than a degree—50 miles or under—could be achieved with hand held instruments with only reasonable care. Measurements to a fraction of this were common.

Aboard ship, on a pitching deck, no such accuracy was possible. When sailing unknown coasts, it was common to send men ashore for accurate readings.

The astrolabe—an arabic word and instrument—was one of the most common angle finding navigational devices of the day. Maritime astrolabes were usually much more simple than the astronomical ones. They were heavier, weighted at the bottom for stability and did not presume over about a half a degree accuracy.

Other instruments were large wood astrolabes, small wood or metal quadrants and backstaffs. All had the same purpose. They were used to determine the angular position of either sun (with shadows) or stars (viewed directly). The sun was far easier to fix than the pole star at night.

An English "rutter," written sailing directions, gives the usual route from San Juan de Ulúa to Havana. Cautioning the pilot to "keepe thy lead going" to stay in deep Gulf water, it illustrates the reading of bottom samples.



Reconstruction of the dividers found at the wreck site. Only fragments remained of this basic navigational instrument.



If you depart from S. Juan de Ullua to Havana, you must stir away Northeast until you bring your selfe in 25 . degrees, and from thence you must stir away East from the little Islands called Las Tortugas, untill you have the sounding of them; and if you finde white sande very small, you shall bee East and West with them; and if your sounding bee shellie ground and periwinkles, or small shelles or skales, then shall you be Northeast and Southwest, and the shelles or skales must bee red, and if at some time you take up blacke sande, then are you North and South with the sayd Tortugas."

From there, one steers southwest to fight the current to Havana. The doomed ships probably did not make it this far before they were caught by the storm.

When the Spanish ships went aground on the Texas coast in the spring of 1554, their story was not over. A great part of it was just beginning.



addendum



a) astrolabe, 1550



b) astrolabe, 1550.



154'

d) astrolabe, 1545 (detail)



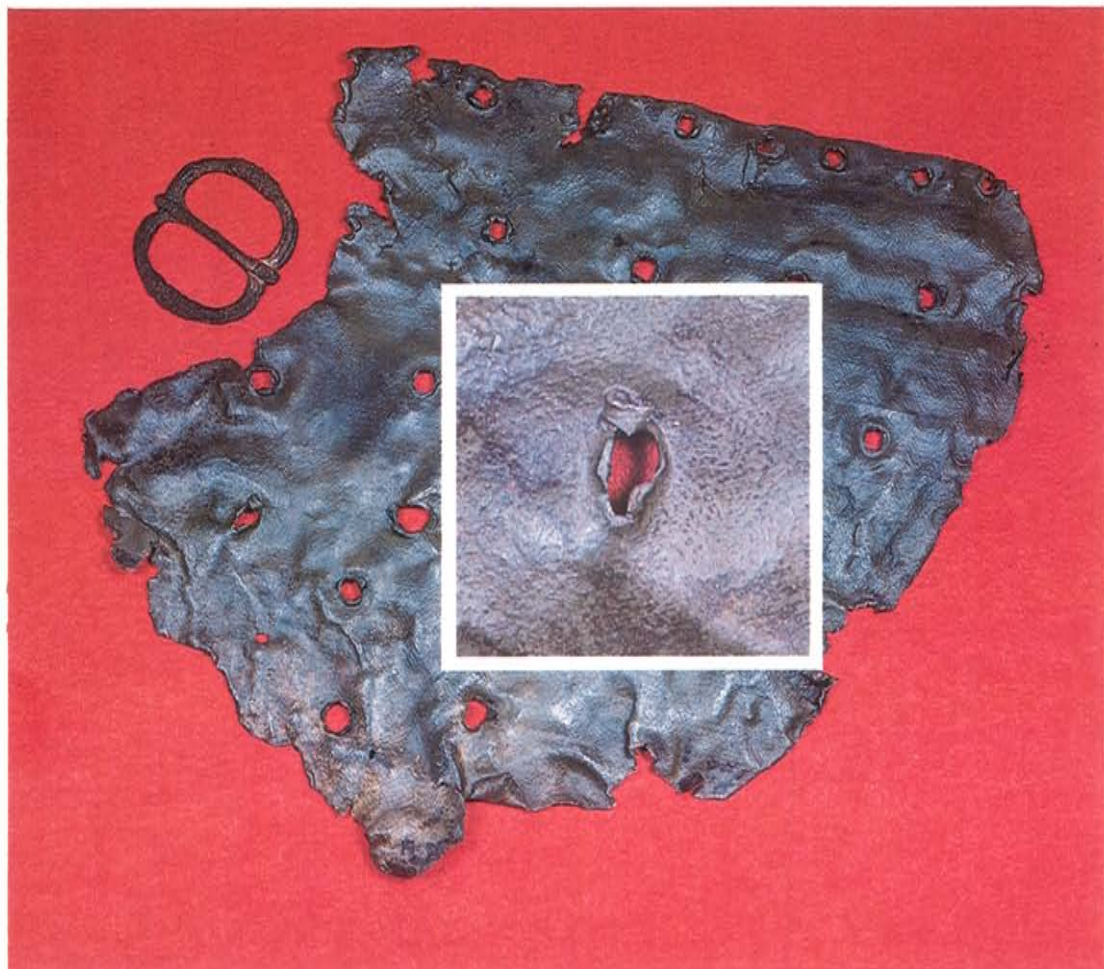
c) astrolabe, 1545.

brass straight pins



belt buckle

lead patch



pig's foot concretion
pewter plate



shipboard tools: sledge,
adze, spike, auger





mint marks on silver disks



pewter porringer



candle spikes



cloth fragment on
pincer concretion

obsidian
blade, iron pyrite
mirror



fishing weights



"X" on breech chamber

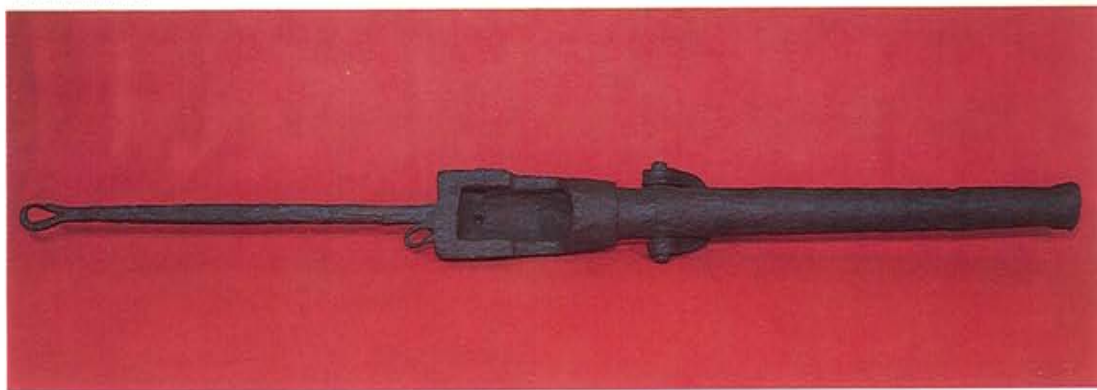
chain mail



bronze breech chamber



verso, bombard





Texas Archeological Research
Laboratory, Austin, Texas

Three astrolabes were found at the shipwreck site. All are cast brass and are in fair condition after more than 400 years.

a) This astrolabe is dated 1550 and may be of Spanish manufacture. The alidade is missing. It is meridionally calibrated (90° at the top) and is unusual in that the numbers of the right quadrant read 08, 07, 06, etc. down to the zero point instead of 80, 70, 60.

b) Markings on this astrolabe date it at 1550 and suggest Portuguese manufacture. The alidade is present and the instrument is calibrated meridionally.

c) This astrolabe, marked 1545, is the oldest known dated such instrument in the world, perhaps made in Portugal as it bears what may be a makers mark. Like the other two, it is meridionally calibrated. The alidade, although bent, is present as are the suspension ring and shackle. Comparable with the other two in size, this instrument is almost 9½ inches (245 mm) in diameter, about ¾ inch (15 mm) thick, and weighs about 8¾ pounds (3968 gm).

d) Detail of the date of the oldest astrolabe. A close look at this corroded date stamped into the metal gives a reading of 1545.

68

These brass straight pins were some of the few personal possessions recovered. In this century, pins were occasionally used to fasten clothing instead of buttons or the future zipper. The tumbler is a modern one, shown for scale.

Lead was a necessity on shipboard. This piece was beaten flat and nailed down possibly as protection from the warm-water shipworms which drilled into the wooden planking of the hull. It may have been simply a patch. The lead shows the impression of fabric which was placed under the lead as a seal.

69

An indication of shipboard food is given by fragments of items found. These include olive pits, nut shell fragments and grain, and bone fragments. A section of a pig's foot perhaps indicates live animals were on board.

Pewter plates were used on shipboard for hundreds of years, usually for officers' or passengers' service. The one shown here is marked with the Tudor Rose indicating English manufacture.

addendum plates

72

The cloth fragments recovered from the concretions are perhaps bits used as patching or wrappings for boxes of cargo. A fragment is shown here with the remains of pincers from the ship's store of tools.

Among the personal possessions carried were native Indian blades of obsidian (a volcanic glass) and a mirror made of polished iron pyrite. These items could have been souvenirs being taken to Spain.

73

Whatever food was carried on the ship, it could be supplemented by fish. These fishing weights were probably made on board for deep water fishing.

The guns of the ship were often marked by their makers or as an indication of which breech chamber fit a particular gun.

74

These fragments of brass chain mail—perhaps part of a shirt or gauntlet—might have belonged to a military man returning to Spain. Iron mail was far more common than brass, even though harder to keep clean of rust, so these fragments may be part of a ceremonial uniform of the day.

This bronze breech chamber was the only one found at the wreck site. The verso it may have matched was not recovered.

The two types of ship's guns found at the wreck site: the bombard, having an average bore of about four inches and the verso at about two inches.

75

An array of large artifacts, almost completely restored, is displayed at the Texas Archeological Research Laboratory, Austin, where most of the restoration and conservation work was done on material from the shipwreck.

Tools of all kinds were a necessity on shipboard. Items found at the site include this sledge hammer head, auger, and adze, pictured with a spike. Work from structural repair on the ship to building barrels had to be done aboard once the journey started.

70

The bullion at the wreck site consisted mainly of rough silver disks, greatly different in size. They are relatively rare because most were converted into coin or objects of art made by silversmiths either in Mexico or Spain.

Most of the disks found have marks stamped into their surface. These indicated place of origin, taxation status, date of casting, tally number, value, purity, and other information now unknown.

a) The X mark may indicate that the silver had been taxed 10% instead of the usual 20%.

b) This obscure circular stamp is probably an official mark bearing some of the same design as found on coins of the day.

c) This mark may be that of an assayer, certifying the quality of the disc.

71

This pewter porringer, shown from the reverse side, was either for officers' or passengers' service while aboard or was a personal item being taken to Spain.

The candle spikes, obviously for holding large candles (they are over three inches long), may have belonged to a passenger. Possibly they were used for religious services on board ship. If so, they were well watched, for open fire aboard ship was a grave danger.

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The research was also based on the following publications related to the project:

- Arnold, J. Barto III. *An Underwater Archeological Magnetometer Survey and Site Test Excavation Project Off Padre Island, Texas*. Publication No. 3 of the Texas Antiquities Committee, August, 1976.
- Hamilton, Donny Leon. *Conservation of Metal Objects from Underwater Sites: A Study in Methods*. Miscellaneous Papers Number 4, The Texas Memorial Museum; Publication Number 1, The Texas Antiquities Committee. May, 1976.
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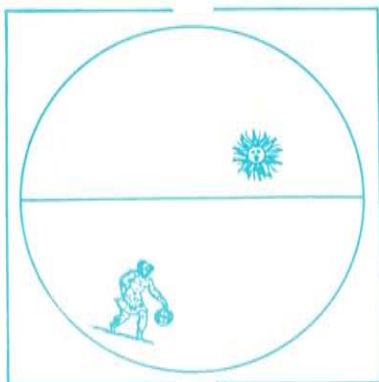
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