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1. Mataró



Mataró is a coastal town on the Mediterranean, about 20 kilometres north of Barcelona.. Her history goes back to Roman times when the town was known as 'Iluro'. She first came to be called 'Mataró' in the twelfth century. Over the years Mataró developed into a thriving city of craftsmen, fishermen and sailors. Today she has more than 100,000 inhabitants

According to tradition the Mataró model came from a small chapel on the eastern perimeter of Mataró. The chapel is dedicated to San Simó (St Simon), one of the apostles. The apostle Simon was one of the fishermen who took Jesus across the Sea of Galilee.

The present-day chapel of San Simó dates from the 16th/17th century. There may well have been a predecessor but this is not (yet) proven. So the Mataró model may have been in the chapel as long ago as the 16th century, if not before. Yet there is no documentary proof of the Mataró model ever being in the San Simó chapel. If such documents existed, they would have been destroyed in 1936 when the chapel was plundered during the Spanish Civil War.

Websites: www.mataró.cat (Catalonian, English)



1. Townplan of Mataró, 18th century, collection Museum Mataró

2. The chapel of San Simó, illustration in: H. Winter, Die Katalanische Nao von 1450 (Maagdenburg 1956).

2. The Origins of the model

Chapel of San Simó in Mataró

The origins of the Mataró model are a mystery. There is an oral tradition that it came from 'l'ermita de San Simó', a chapel in present-day Mataró. The chapel was originally located to the north of Mataró. But are any of these stories true? There are no written documents to prove it.

San Elm

There are a number of churches in the vicinity of Mataró dedicated to Saint Elmo, or Saint Erasmus (not to be confused with Erasmus of Rotterdam). As the patron saint of sailors Elmo was popular in Catalonia. According to legend he prayed throughout a violent storm. Saint Elmo's fire - the electrical discharge which sometimes follows such a storm - is named after him.

In drawings and paintings Saint Elmo is often portrayed with a ship. There is one remarkable image of St Elmo from the 17th or 18th century. He has a small ship in his hands which looks very much like the Mataró model. Could this image actually have been based on the Mataró model? Was the Mataró model kept in one of the churches or chapels dedicated to Saint Elmo in Catalonia?

Travels of the model

It is thought that the model was purchased by an antique dealer from Barcelona in the first decade of the 20th century. He sold it to Tómas Harris, an art dealer from London specialising in Spanish art (hence his 'Spanish Art Gallery'). He in turn sold the model to antique dealer Julius Böhler of Munich. Böhler exhibited it in 1929 at the Reinhardt Galleries in New York, but did not find a buyer. The model then returned to Europe.

Acquisition by the Rotterdam Maritime Museum

In 1929 the Dutch art collector and dealer Frits Lugt purchased the Mataró model. He tried to sell it to the Maritime Museum in Amsterdam, but without success. The Rotterdam Maritime Museum showed an interest but had insufficient funds. Frits Lugt and the director of the Rotterdam Maritime Museum, Jan Willem van Nouhuys, found someone prepared to buy the model, namely harbour baron and art collector Daniël George van Beuningen. In 1930 it was lent to the Rotterdam museum. In 1981 it was finally purchased for the museum with the full support of the G. Ph. Verhagen Foundation.

St Elm

[http://en.wikipedia.org/wiki/Erasmus_\(saint\)](http://en.wikipedia.org/wiki/Erasmus_(saint))

Pedigree of the Mataró-model

<http://www.iemed.org/activitats/2004/mediterraneum/documentacio/anau.pdf>

D.G. van Beuningen (in Dutch only) <http://www.inghist.nl/Onderzoek/Projecten/BWN/lemmata/bwn2/beuningen>

F. Lugt

http://en.wikipedia.org/wiki/Frits_Lugt



1. San Elm, 17th -18th century, illustration in: Josep Colomer, Sant Elm i la coca (Callela 1989).

2. D.G. van Beuningen on deck the "Vigilanter", ca. 1930. Collection National Archives, The Hague

3. Protection



There are two fine carvings on the bow of the Mataró model. Time has taken its toll, but they are still recognisable as being a monster/dragon-like creature and a man with a beard. What is their significance?

Monsters

The Mataró model portrays a ship that sailed the Mediterranean in the late middle ages. Her crew would have been threatened by numerous dangers such as storms and shipwreck, and merchant ships risked attack by pirates. The sailors of the day also believed in mythical creatures like mermaids, sea dragons and other denizens of the deep.

It was precisely to ward off such creatures that ships were fitted with their own 'monsters'. These were supposed to protect the ship and her crew from evil. The Greeks had a similar practice. In many pictures and drawings of the late middle ages, the monster appears as ornamentation on the stem or stern of the ship. By the 17th century these had given way to a single carving on the prow. For a long time the most popular figurehead protecting ship and crew from evil was a bloodthirsty lion. In the 19th century it was a woman.

The knight head

The man with the beard on the front deck of the ship is particularly interesting. There is nothing comparable to be found in the pictures and drawings the late middle ages. We do see similar, small human figures on ships of the 17th century however. The mooring ropes were coiled around them, hence the name 'knight head'..



1. Monster
2. Knight head

Apart from holding on to coils of mooring rope the servant on the Mataró model probably had a symbolic function; he was always on the lookout!

4. Ship models in churches

Ship models are to be found on display in churches and chapels along the coastlines of Europe. This is part of a tradition that goes back to the middle ages. The Mataró model, dating from the 15th century, is a unique example in this regard.

Ship models are often to be found in local churches near the sea. This is not so surprising. In such communities the sea is a dominating influence on the lives of everyone. Why display a ship model inside a church? There are various explanations. It may have been promised – and given – in thanks for surviving at sea. As in the case of master mariner Nanne Woutersz. In 1393 he was threatened first by pirates and then by shipwreck. We swore an oath to give the Virgin Mary a ship of wax if he made it home safely. He survived, and he was as good as his word. He donated a ship to the church in Den Bosch, but instead of wax it was made of silver. Gifts of this kind are known as 'ex voto', from the Latin word 'votum' which means both promise and oath, and is therefore a promise which must be kept. Model ships given in this way are also referred to as votary ships.

Even today model ships are given to churches – often protestant - in Northwestern Europe. They are not given to fulfil past promises however, but for use as ornaments and symbols. They symbolise the bond between man and the sea. The situation is different in Southern European countries, where catholicism is widespread. In these countries a wide variety of ex voto donations are still made to the church.

The exact function of the Mataró model is not known, due to the lack of sources. Ship models are often suspended inside the church, but certainly not the Mataró. Her body structure is not strong enough. The hull is fairly flat. so that with a little support the model can rest on its keel. So we may reasonably conclude that the model rested on its keel, perhaps next to the altar, in a recess or on the floor beams.



1. Copy of the Mataró model in the Santa Maria del Mar, Barcelona (illustration from a postcard)

2. Princess Eudoxia in front of the tomb of Saint Stephanus, collection Museu Nacional d'Art de Catalunya, Barcelona

5. Mataró model described and portrayed

The Mataró model has always been one of the most important items at the Maritime Museum. And with good reason; it is the oldest model in the collection. In 1930 the then director wrote an article about the model in both Dutch and English.

For a long time the Mataró model was used as the museum logo. Letter paper was embellished with a sketch of the Mataró, as were the bookplates of every new book.

The model was also portrayed on the roof of the old museum building (since demolished) at the 's Jacobplein address, in the form of a large, wrought-iron sculpture by artist K.J. Gellings (1892-1959).

In Catalan, from where the model originates, the loss of the Mataró model is still very much regretted. Many Catalonians regard the model as a national symbol, perhaps because it dates from a period when Catalan was powerful and independent. Numerous copies have been built. There is one at the (national) historical museum in Barcelona, and another at the parish church Santa Maria del Mar in Barcelona. In 1996 the Mataró model was briefly immortalised on the 5 ECU coin (predecessor of the Euro).

Memories of the model are kept very much alive in Mataró itself. The inhabitants are convinced that the model came from Mataró. There are copies on exhibit at the local museum and also of course at the chapel of San Simó where, according to local tradition, the original model once stood.

The model is used as a logo on public announcements for big annual festivals such as 'Santes' and the holiday commemorating the death of Saint Simon.

For model makers the world over, the Mataró is a source of inspiration. It is a huge challenge to reconstruct the model accurately. It is both extremely detailed and extremely weather-beaten. Results therefore tend to vary. A quick search on the internet will give you some idea of the sheer number and variety of reconstructed Mataró models.

Website : search on google for the term "coca de Mataró"



1. Ex-libris Maritiem Museum 'Prins Hendrik', collection Maritiem Museum Rotterdam

2. Poster of the "Santes" in Mataró, 1962. collection Museu de Mataró., Mataró

3. Ecu-coin, 1996, collection Maritiem Museum Rotterdam.



6. The making of the model

A ship on the stocks

The Mataró model is faithful imitation of a ship of the late middle ages. The model is so precise it is virtually certain to have been made by a shipbuilder. It was probably built 'on the stocks' in the same way as a real ship. This means the keel beam is laid, the prow and stern drawn up. After that the internal structure is built, and the outside planks attached., the deck laid, and the forecastle and aftercastle placed on top. Finally the hull is caulked and an extra protective layer of tallow applied.

Carvel-built construction

The Mataró model is built according to a tradition that stems from the Mediterranean Sea. The outside planks are fitted together in such a way that they create a smooth skin. This is called carvel-built construction. In 15th century north-western Europe a different construction method was used, whereby the outside planks overlap like roof tiles. This is called clinker-built construction.

Materials

The most important material in the Mataró model is wood, especially poplar wood. Shipbuilders would normally have used oak to make a real ship, but the model-builder probably chose poplar because it is easier to work with.

Apart from wood there is also a lot of iron in the model, especially in the form of nails. Only the nail heads are visible in the ship's skin. The mounting for the rudder is also made of iron. There are no anchors with the Mataró model. In real life these would also have been made of iron.

Labour

The Mataró model was probably built by a single model builder. Naturally more people would be involved in the building of a real ship, including the shipwright/ship's carpenter, a blacksmith to make the nails (among other things), a rope-maker and a sail-maker. Sometimes a sculptor would also be called upon to carve the ship ornaments.

Shipbuilding yards in the late middle ages varied in size. Some employed just a few shipwrights, whereas the large (city) shipyards such as the one in Venice employed several hundred.



1. Noah building the Ark from the World-chronicle by Hartmann Schedel, 1492

2. The hull is protected with tallow.

7. Types of ship

Introduction

No-one knows for sure what type of ship the Mataró model represents. In written sources from the late middle ages various ships are referred to by name, but their characteristics are not usually defined. Often the differences are very small anyway. Even though we cannot say for sure what type of ship the Mataró model represents, a number of suggestions have been made.

The nau

Many ships are referred to as 'nau'. This word is related to the Latin 'navis', which simply means 'ship'. Ships both large and small are called 'nau'. In 1435 the nau 'St Nicholau' from San Feliu in Catalan, for example, had a crew of 8, but in 1426 the nau 'Santa Maria' from Barcelona had a crew of 40 and 30 archers on board. Is the Mataró model a nau?

The coca

Many ships are also referred to as 'coca', 'cocha' or 'cocche'. This sounds very similar to the Dutch word 'kog' (cog or cock-boat). This is no coincidence. According to the Florentine chronicler Giovanni Villani (1277-1348) the first West European cogs arrived in the Mediterranean Sea in 1304. He writes: "Certain people from Bayone in Gascogne entered the Strait of Gibraltar in 1304 as pirates, in their ships called cogs, and caused huge damage. But the Genoese, the Venetians and the Catalonians then started copying the ship."

So the northern method of building ships was introduced to the Mediterranean in the 14th century. What were the differences southern and northern European shipbuilding? In the Mediterranean ships were traditionally built with a triangular lateen sail and a side rudder. The cog on the other hand was clinker-built, square-rigged, and had a rear rudder. The Mediterranean and West European shipbuilding traditions are actually merged in the coca. The coca is clinker-built with rear rudder, one or two masts, and square rigged. The Mataró model has often been called a coca, but it could equally be a nau or some other type of ship altogether.

The Caravel

In 1930 J.W. van Nouhuys director of the Rotterdam Maritime Museum described the Mataró model as the 'Spanish caravel'. This is somewhat confusing since it also seems to suggest the Mediterranean technique of 'carvel-built' construction. For this reason the term 'caravel' is no longer used very much.

In the 15th century the caravel certainly occurred as a type of ship. In 1455 for example, someone from Valencia bought a caravel moored in Mataró; it was not a big ship. So we cannot exclude the possibility that the Mataró model was based on a caravel.



1. Ship with one mast, detail altarpiece Johannes Reixach, Barcelona, 15th century] Collection Museu Nacional d'Art de Catalunya , Barcelona

2. Ship in distress, detail altarpiece, 15th century, anonymous Collection Museu Nacional d'Art de Catalunya , Barcelona

8. Quest for antiquity

On the basis of its appearance and the sheer complexity of the Mataró model's construction, it has always been assumed to represent a small, 15th century ship. But nobody knows exactly when in the 15th century it was built, and scholars would very much like to find out.

It was hoped that scientific testing would show the way. Dendrological investigation (studying annual growth rings in the wood) proved impossible. Carbon 14 dating could be carried out however. The C-14 method is based on the presence of carbon in living material. C-14 is a radioactive isotope of carbon. When a living thing dies (in this case the moment when the tree is felled) the amount of radioactivity it contains begins to decline, and it continues to do so over the centuries that follow. This means that by measuring the amount of radioactivity in a piece of material, such as wood, we can determine approximately how old it is.

A fragment of wood was drilled from the keel; this was done at the museum. It was tested by the R.J. van de Graaff laboratory at the University of Utrecht. The date they arrived at was 1419 plus or minus 30 years (1389-1449).

This does not give us a definitive answer to the question of when the model was built however, if only because the original trees may have been cut down long before they were used. But we may (cautiously) assume that the model is from the early 15th century.



1. The drilling of a hole in the model for the removal of a woodsample.
2. The woodsample.

9. The woodresearch



What kind of wood is the model made from? We were told for decades that it was made of cork oak. Cork oak is particularly common in southern Europe, but was the model built there?

To find some answers we turned to the specialist agency Biaxconsult of Zaandam.

Very cautiously, in various places such as the keel beam, forecastle, deck and yard, wood slices less than one millimeter thick were taken from the model.

The results of the tests were surprising. There was no trace of cork oak, but they did find mulberry, a tree particularly common to the Mediterranean area. The keel beam is made of mulberry. But other types of wood have been used as well, such as poplar, willow and rough pine. All three of these are found throughout western Europe.

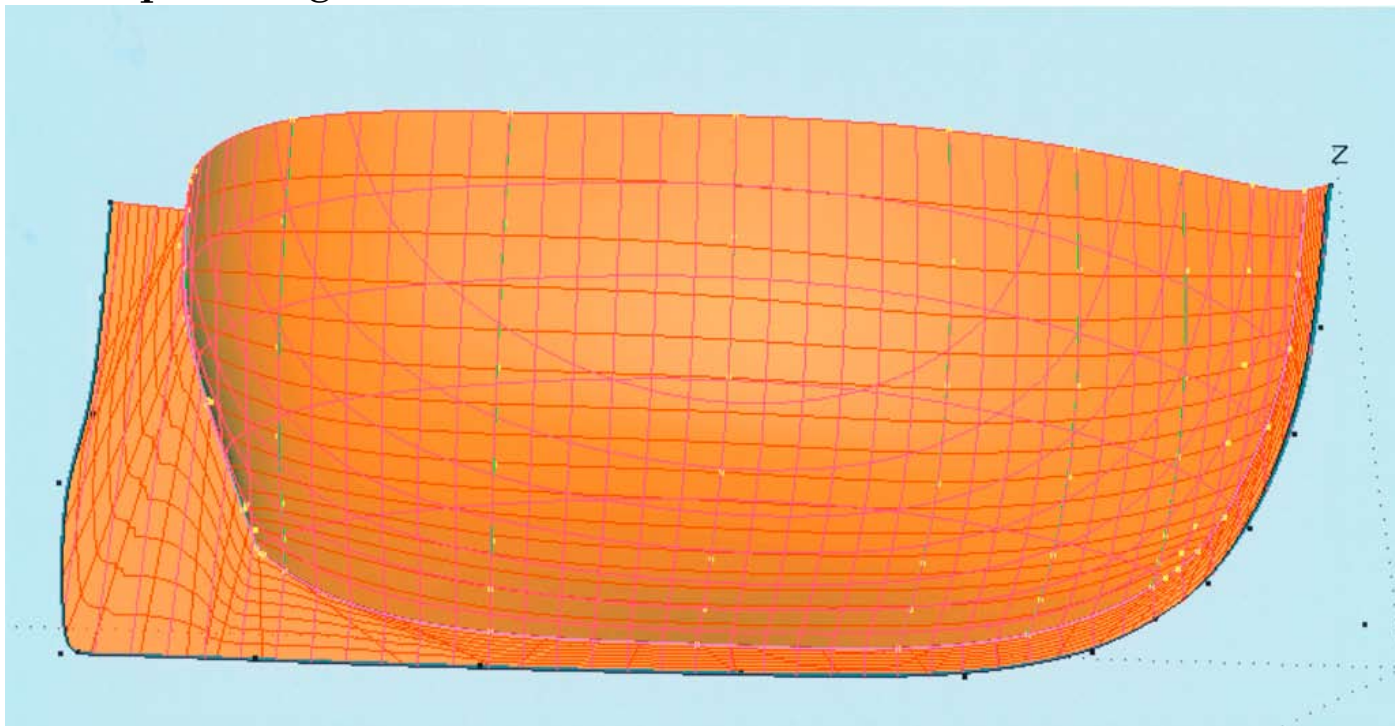
Links: www.biax.nl



1. The removal of a thin slice of wood for analysis.

2. The cross-section of a woodsample.

10. Shipbuilding research



What intrigues us most is whether the model is a genuine reproduction of a ship from the fifteenth century. One of the studies carried out focused on shipbuilding aspects, asking whether the shape of the ship could represent a realistic, seaworthy, cargo-carrying sailing vessel.

In 1983 the Shipbuilding Agency in Bloemendaal investigated the model. Stability calculations were carried out on the basis of the line plan translated to a real ship on a scale of 1:18, which was assumed to be fairly close. These calculations showed that the projected ship fulfils all the basic stability requirements.

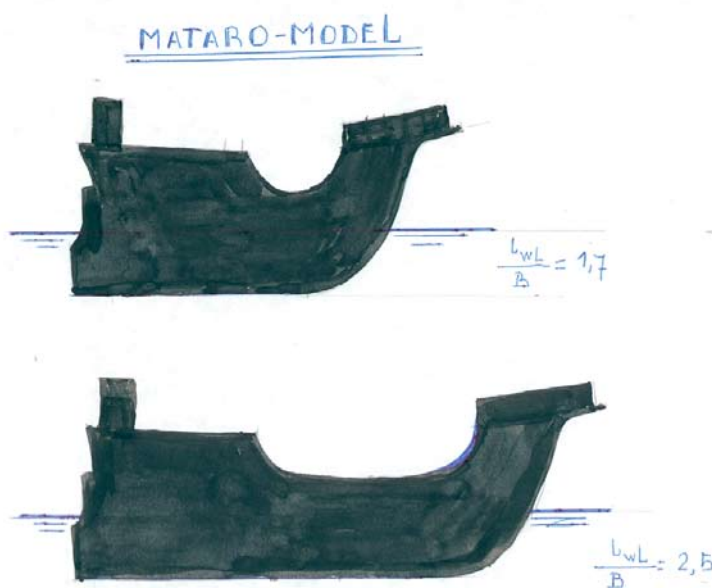
In 2003 Professor J. Gerritsma, ir. H. Wimmers and John Jansen Design approached the model from a shipbuilding perspective and tried to answer a number of questions about the ship's stability, manoeuvrability, speed and sail properties using modern drawing and computing techniques.

According to their study, the shape of the hull of the Mataró model is not realistic in shipbuilding terms. As previously, a scale of 1:18 was assumed, which means a width of 9.70 metres and a (water line) length of slightly more than 16 metres. This gives a length/width ratio of 1.8, which is considerably less than the average length/width ratio of a number of other ships of the late middle ages, such as the Bremer cog, from around 1370, which has a length-width ratio of 3:1.

We may conclude that the 'real ship' would be stable at rest, but very difficult to steer once it got moving. The stern for example is very full so that there is not enough room for the rudder; this makes it difficult to correct the course.

How would the ship perform under sail? To find out we would have to do some experiments using a test tank and wind tunnel. In view of the unrealistic shape of the ship however, it was decided not to do these experiments.

Another interesting question is this: what would we have to do to the ship to make it reasonably



seaworthy? It would in fact have to be lengthened by a factor of 1.5. That gives a length/width ratio of 2.7:1 which corresponds better to other ships of the late middle ages.

Finally, some research was carried out into the weight/cargo capacity of the model. It is assumed that the ship must have had a between-deck. Counting rigging, anchoring gear, a 20 man crew, provisions and water, this gave a total weight of 65 tons.

1. Research into the Mataró-model by John Jansen Design with the aid of the software programme Multisurf

2. Sketch of H. Wimmers of the Mataró-model. Below, amidship lengthened with a factor 1.5.

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Signatuur: 9 D 2 WINT

12. Colofon

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